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FLORA

OF

BRITISH INDIA.

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THE

FLORA OF BRITISH INDIA.

BY

J. D. HOOKER, C.B.

M.D., PRES. R.S., D.C.L. OXON., LL.D. CANTAB.

CORRESPONDING MEMBER OF THE INSTITUTE OF FRANCE, AND HON. MEMBER OF THE
ASIATIC SOCIETY OF BENGAL.

ASSISTED BY VARIOUS BOTANISTS.

VOL. I.

RANUNCULACEÆ TO SAPINDACEÆ.

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PART I.

RANUNCULACEÆ TO POLYGALEÆ.

PUBLISHED UNDER THE AUTHORITY OF THE SECRETARY OF STATE FOR
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TO

HIS GRACE THE DUKE OF ARGYLL, K.T., F.R.S.,

SECRETARY OF STATE FOR INDIA,
PRESIDENT OF THE GEOLOGICAL SOCIETY OF LONDON;
&c. &c. &c.

MY LORD DUKE,

The fact of this first part of the "Flora of British India" appearing during your Grace's tenure of office, and under your instructions, affords me the welcome opportunity of following a time-honoured custom in dedicating that work to you. And I congratulate myself on being so circumstanced, since I am thus enabled to express my respect for your high scientific attainments and for those original observations and writings which have appeared during the long period that has elapsed since I first enjoyed the privilege of friendly intercourse with your Grace, which long antedates your scientific career and my official connexion with you.

I am,
Your Grace's faithful and obedient Servant,
JOS. D. HOOKER.

ROYAL GARDENS, KEW,
March 15, 1872.

PREFACE.

THE Flora of British India is intended to comprise within a moderate compass brief descriptions, ordinal, generic and specific, of the Flowering plants and Ferns hitherto found within the British territories in India, together with those of Kashmir and Western Tibet; countries which, though outside that territory, belong to botanical regions included within it, which have been geographically and botanically explored by officers employed almost exclusively in the Indian service, and which are habitually visited by Indian tourists and travellers. It was originally intended to have included the Floras of Affghanistan and Beluchistan, as was done in the fragmentary "Flora Indica," commenced in 1855 by Dr. T. Thomson and myself; but the plants of these countries having been recently included in Boissier's excellent "Flora Orientalis," and belonging to quite another botanical region (the Occidental Asiatic), this intention has been abandoned.

At the outset it must be stated, that in a work of this scope, neither fulness nor completeness are attainable in the present state of science. British Indian Botany is represented by some 12–14,000 species, and by hundreds of thousands of specimens, collected over an area of one and a half millions of square miles, in tropical, temperate, and frigid climates, and at all elevations, from the sea-level to 19,000 ft. Of this vast assemblage, not a twelfth part has hitherto been brought together in any one general work on Indian plants. The descriptions of such as are well described, are scattered through innumerable British and foreign journals, or contained in Local Floras, or works on general Botany; a very large number are described so incompletely or inaccurately, that they can only be recognized after an inspection of the original specimens; and very many are altogether undescribed. In short, there is no quarter of the globe so rich in plants, and from which such a mass of materials has been collected and deposited in European museums; and yet of which so little of the Natural History, and especially the Botany, has been systematically brought together. Under these circumstances an exhaustive Flora would be a work of many years and many volumes; and it is as a hand-book to what is already known, and a pioneer to more complete works, that the present is put forward.

For an account of the materials upon which it is founded, the reader is referred to the Introductory Essay to the Flora Indica alluded to above, which contains a history of Indian Botany up to 1855, together with an essay on the climates and physical features of India, and on its divisions into Botanico-Geographical provinces. Since the date of its publication, no great systematically arranged collections of Indian plants, such as those of Wallich, Wight, Stocks, Strachey and Winterbottom, &c. &c., have been added to these; though many very valuable local collections have been made; amongst which the Malaccan Herbarium of the late Dr. Maingay, and the South Indian of Major Beddome, present the most novelty and interest. Since that period, too, the vast Herbaria of Griffith and Falconer have been made over to Kew by the late East Indian Government, and though in a ruinous condition from damp and vermin, have been arranged and distributed; Wight's invaluable original Herbarium has been added to that of Kew, by private gift from that veteran botanist, and its duplicates also distributed from this establishment; and Rottler's own Herbarium has been transferred from the Museum of King's College, London, and liberally presented to Kew by order of the Council of that Institution. The value of these last two collections, as containing the type specimens of plants described in so many old and modern works, cannot be over-estimated.

The plan approved by his Grace the Secretary of State for India, for bringing out this Flora, viz., of associating with myself a number of competent botanists, whose names will appear in the headings of the pages they (wholly or in part) shall contribute, will, it is hoped, enable me to bring it out with reasonable celerity; whilst the adoption of as concise a style and phraseology* as is consistent with clearness, and the avoidance of repetition in the descriptions and remarks on each species, will enable me to compress the whole into a portable form.

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* In these matters my Flora of the British Islands has been followed; the style there adopted having been suggested by the requirements of the Professors of Botany in the Scotch Universities, and approved by them, seemed to me to be equally applicable to a more extended.

With regard to citations of previous works, and references to authors, these have been reduced to what appears to be most useful and desirable for working and especially Indian botanists. As a rule, all Indian Floras are quoted, as also the work wherein the species was first described under the name it bears; the chief exceptions to the latter are in cases where the author has redescribed the plant in a subsequent better known general work, when the latter alone is cited.*

I have been compelled to confine the citations of numbered distributed collections to Wallich's; to have introduced the numbers of Wight's, Jacquemont's, Hohenacker's, Strachey and Winterbottom's, Griffith's, Falconer's, Helfer's, Maingay's, Thwaites's, Hooker fil. and Thomson's, and other collections that have been distributed from Kew and elsewhere, would have added at least another volume to the work, and would have prolonged indefinitely the time and cost of its production. All such references, if not checked in the proofs, as well as in the MS., are sure to abound in errors; as do indeed the collections themselves, requiring in such cases the introduction of cross references, discussions and critical notes, essential for the verification of specimens, but not necessarily of species. Moreover, such references would not have proved of the smallest use to the Indian resident and traveller, for whom this work is specially intended.

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* Thus De Candolle's fragmentary "Systema" is not quoted for plants subsequently included in his universally used "Prodromus;" nor Boissier's inaccessible "Diagnoses Plantarum Orientalium" for those subsequently included in his great work, the "Flora Orientalis." The interposition of a semicolon between the author's name and that of the work cited, indicates that the plant was not first described in that work; its absence indicates that it was.

With regard to the vexed question, whether to attach to a species the name of the author who first described it, or of him who first put it into the genus to which I think that it belongs, I have adopted the latter alternative, chiefly on the principle that a right comprehension of genera is of higher importance than the power of describing a species. The number of species described by authors who cannot determine their affinities, increases annually, and I regard the naturalist who puts a described plant into its proper position in regard to its allies, as rendering a greater service to science than its describer, when he either puts it into a wrong place, or throws it into any of those chaotic heaps miscalled genera, with which systematic works still abound. I however admit, that no laws or usages embrace all cases of disputed authority or priority, and that the best hitherto proposed are open to great abuses; but after many years' experience I find that the plan which, in common with the majority of botanists, I have followed, is open to the fewest objections, and does justice to the greatest and most deserving number of naturalists.

And here I must caution botanists against an over-reliance upon the names attached to the Indian collections which have been distributed from Kew, first by myself, and latterly by the keeper of the herbarium, between 1855 and 1870. These collections originally comprised about half a million of specimens, which had been accumulating for upwards of thirty years, principally in the India House (where a great number were wholly destroyed by damp and vermin), at Kew, and at the Linnean Society, and consisted chiefly of the collections of Griffith, Falconer, Helfer, Royle, G. Thomson, T. Thomson and myself, Law, Stocks, Dalzell, and Gibson, together with the remainder of Wallich's, and latterly Wight's. From these, after arrangement, upwards of 380,000 specimens were distributed in sets to public and private museums in Europe, India, and America, every specimen bearing a ticket with the name of the locality and collector, and that of the plant, as far as it could be approximately determined. I have no reason to suppose that these collections contain more errors in nomenclature than do similar ones; but, as was explicitly stated when they were sent out, such names are not to be regarded as authoritative.

The area over which each species is distributed, is indicated by districts; these districts or geographical areas being botanical regions, which coincide in the main so closely with the well recognized territorial divisions of India, that a strict definition of them is unnecessary: an account of their limits and physical features will be found in the Introductory Essay to the Flora Indica, and its accompanying maps.

It has been a source of most sincere regret to me that a combination of circumstances has prevented the continuation of the Indian Flora upon the originally contemplated and more extended plan, under the joint authorship of my old friend and fellow-traveller, Dr. Thomson, and myself. Other duties in our respective services necessitated its postponement for a very long period, until indeed it became obvious that years were not left to us, even could we have commanded sufficient leisure, to finish so laborious an undertaking.

OUTLINES OF BOTANY.

FROM MR. BENTHAM'S BRITISH AND COLONIAL FLORAS.

CHAP. I. DEFINITIONS AND DESCRIPTIVE BOTANY.

1. The principal object of a **Flora** of a country is to afford the means of *determining* (*i.e.*, ascertaining the name of) any plant growing in it, whether for the purpose of ulterior study or of intellectual exercise.

2. With this view, a Flora consists of descriptions of all the wild or native plants contained in the country in question, so drawn up and arranged that the student may identify with the corresponding description any individual specimen which he may gather.

3. These descriptions should be *clear*, *concise*, *accurate*, and *characteristic*, so as that each one should be readily adapted to the plant it relates to, and to no other one; they should be as nearly as possible arranged under *natural* (184) divisions, so as to facilitate the comparison of each plant with those nearest allied to it; and they should be accompanied by an *artificial key* or index, by means of which the student may be guided step by step in the observation of such peculiarities or *characters* in his plant, as may lead him, with the least delay, to the individual description belonging to it.

4. For descriptions to be clear and readily intelligible, they should be expressed as much as possible in ordinary well-established language. But, for the purpose of accuracy, it is necessary not only to give a more precise technical meaning to many terms used more or less vaguely in common conversation, but also to introduce purely technical names for such parts of plants or forms as are of little importance except to the botanist. In the present chapter it is proposed to define such *technical* or *technically limited* terms as are made use of in these Floras.

5. At the same time mathematical accuracy must not be expected. The forms and appearances assumed by plants and their parts are infinite. Names cannot be invented for all; those even that have been proposed are too numerous for ordinary memories. Many are derived from supposed resemblances to well-known forms or objects. These resemblances are differently appreciated by different persons, and the same term is not only differently applied by different botanists, but it frequently happens that the same writer is led on different occasions to give somewhat different meanings to the same word. The botanist's endeavours should always be, on the one hand, to make as near an approach to precision as circumstances will allow; and, on the other hand, to avoid that prolixity of detail and overloading with technical terms which tends rather to confusion than clearness. In this he will be more or less successful. The aptness of a botanical description, like the beauty of a work of imagination, will always vary with the style and genius of the author.

§ 1. *The Plant in General.*

6. The **Plant,** in its botanical sense, includes every being which has *vegetable life*, from the loftiest tree which adorns our landscapes, to the humblest moss which grows on its stem, to the mould or fungus which attacks our provisions, or the green scum that floats on our ponds.

7. Every portion of a plant which has a distinct part or *function* to perform in the operations or phenomena of vegetable life is called an **Organ.**

8. What constitutes *vegetable life*, and what are the functions of each organ, belong to *Vegetable Physiology;* the microscopical structure of the tissues composing the organs, to *Vegetable Anatomy;* the composition of the substances of which they are formed, to *Vegetable Chemistry;* under *Descriptive and Systematic Botany* we have chiefly to consider the forms of organs, that is, their *Morphology*, in the proper sense of the term, and their general structure so far as it affects classification and specific resemblances and differences. The terms we shall now define belong chiefly to the latter branch of Botany, as being that which is essential for the investigation of the Flora of a country. We shall add, however, a short chapter on Vegetable Anatomy and Physiology, as a general knowledge of both imparts an additional interest to and facilitates the comparison of the characters and affinities of the plants examined.

9. In the more perfect plants, their organs are comprised in the general terms **Root, Stem, Leaves, Flowers,** and **Fruit.** Of these the three first, whose function is to assist in the growth of the plant, are *Organs of Vegetation;* the flower and fruit, whose office is the formation of the seed, are the *Organs of Reproduction.*

10. All these organs exist, in one shape or another, at some period of the life of most, if not all, *flowering plants*, technically called *phænogamous* or *phanerogamous plants:* which all bear some kind of flower and fruit in the botanical sense of the term. In the lower classes, the ferns, mosses, fungi, moulds or mildews, seaweeds, etc., called by botanists *cryptogamous plants*, the flowers, the fruit, and not unfrequently one or more of the organs of vegetation, are either wanting, or replaced by organs so different as to be hardly capable of bearing the same name.

11. The observations comprised in the following pages refer exclusively to the flowering or phænogamous plants. The study of the cryptogamous classes has now become so complicated as to form almost a separate science. They are therefore not included in these introductory observations, nor, with the exception of ferns and their allies, in the present Flora.

12. **Plants** are

Monocarpic, if they die after one flowering-season. These include *Annuals*, which flower in the same year in which they are raised from seed; and *Biennials*, which only flower in the year following that in which they are sown.

Caulocarpic, if, after flowering, the whole or part of the plant lives through the winter and produces fresh flowers another season. These include *Herbaceous perennials*, in which the greater part of the plant dies after flowering, leaving only a small perennial portion called the Stock or Caudex, close to or within the earth; *Undershrubs, suffruticose* or *suffrutescent* plants, in which the flowering branches, forming a considerable portion of the plant, die down after flowering, but leave a more or less prominent perennial and woody base; *Shrubs* (*frutescent* or *fruticose plants*), in which the perennial woody part forms the greater part of the plant, but branches near the base, and does not much exceed a man's height; and *Trees (arboreous* or *arborescent plants)* when the height is greater and forms a woody *trunk*, scarcely branching from the base. *Bushes* are low, much branched shrubs.

13. The terms *Monocarpic* and *Caulocarpic* are but little used, but the other distinctions enumerated above are universally attended to, although more useful to the gardener than to the botanist, who cannot always assign to them any precise character. Monocarpic plants, which require more than two or three years to produce their flowers, will often, under certain circumstances, become herbaceous perennials, and are generally confounded with them. Truly perennial herbs will often commence flowering the first year, and have then all the appearance of annuals. Many tall shrubs and trees lose annually their flowering branches like undershrubs. And the same botanical species may be an annual or a perennial, a herbaceous perennial or an undershrub, an undershrub or a shrub, a shrub or a tree, according to climate, treatment, or variety.

14. Plants are usually *terrestrial*, that is, growing on earth, or *aquatic, i.e.*, growing in water; but sometimes they may be found attached by their roots to other plants, in which case they are *epiphytes* when simply growing upon other plants

without penetrating into their tissue, *parasites* when their roots penetrate into and derive more or less nutriment from the plant to which they are attached.

15. The simplest form of the perfect plant, the annual, consists of—

(1) The **Root,** or descending axis, which grows downwards from the stem, divides and spreads in the earth or water, and absorbs food for the plant through the extremities of its branches.

(2) The **Stem,** or ascending axis, which grows upwards from the root, branches and bears first one or more leaves in succession, then one or more flowers, and finally one or more fruits. It contains the tissues or other channels (217) by which the nutriment absorbed by the roots is conveyed in the form of *sap* (192) to the leaves or other points of the surface of the plant, to be *elaborated* or *digested* (218), and afterwards redistributed over different parts of the plant for its support and growth.

(3) The **Leaves,** usually flat, green, and horizontal, are variously arranged on the stem and its branches. They *elaborate* or *digest* (218) the nutriment brought to them through the stem, absorb carbonic acid gas from the air, exhaling the superfluous oxygen, and returning the assimilated sap to the stem.

(4) The **Flowers,** usually placed at or towards the extremities of the branches. They are destined to form the future seed. When perfect and complete they consist: 1st, of a *pistil* in the centre, consisting of one or more *carpels*, each containing the germ of one or more seeds; 2nd, of one or more *stamens* outside the pistil, whose action is necessary to *fertilize* the pistil or enable it to ripen its seed; 3rd, of a *perianth* or *floral envelope*, which usually encloses the stamens and pistil when young, and expands and exposes them to view when fully formed. This complete perianth is double: the outer one, called *Calyx*, is usually more green and leaf-like; the inner one, called the *Corolla*, more conspicuous, and variously coloured. It is the perianth, and especially the corolla, as the most showy part, that is generally called the flower in popular language.

(5) The **Fruit,** consisting of the pistil or its lower portion, which persists or remains attached to the plant after the remainder of the flower has withered and fallen off. It enlarges and alters more or less in shape or consistence, becomes a *seed-vessel*, enclosing the seed until it is ripe, when it either opens to discharge the seed or falls to the ground with the seed. In popular language the term *fruit* is often limited to such seed-vessels as are or look juicy and eatable. Botanists give that name to all seed-vessels.

16. The herbaceous perennial resembles the annual during the first year of its growth; but it also forms (usually towards the close of the season), on its *stock* (the portion of the stem and root which does not die), one or more *buds*, either exposed, and then popularly called *eyes*, or concealed among leaves. These buds, called *leaf-buds*, to distinguish them from *flower-buds* or unopened flowers, are future branches as yet undeveloped; they remain dormant through the winter, and the following spring grow out into new stems bearing leaves and flowers like those of the preceding year, whilst the lower part of the stock emits fresh roots to replace those which had perished at the same time as the stems.

17. Shrubs and trees form similar leaf-buds either at the extremity of their branches, or along the branches of the year. In the latter case these buds are usually *axillary*, that is, they appear in the *axil* of each leaf, *i.e.*, in the angle formed by the leaf and the branch. When they appear at any other part of the plant, they are called *adventitious*. If these buds by producing roots (19) become distinct plants before separating from the parent, or if adventitious leaf buds are produced in the place of flowers or seeds, the plant is said to be *viviparous* or *proliferous*.

§ 2. *The Root.*

18. **Roots** ordinarily produce neither buds, leaves, nor flowers. Their branches, called *fibres* when slender and long, proceed irregularly from any part of their surface.

19. Although roots proceed usually from the base of the stem or stock, they may also be produced from the base of any bud, especially if the bud lie along the ground, or is otherwise placed by nature or art in circumstances favourable for their development, or indeed occasionally from almost any part of the plant. They

are then often distinguished as *adventitious,* and this term is by some applied to all roots which are not in prolongation of the original radicle.

20. **Roots** are

fibrous, when they consist chiefly of slender fibres.

tuberous, when either the main root or its branches are thickened into one or more short fleshy or woody masses called *tubers* (25).

taproots, when the main root descends perpendicularly into the earth, emitting only very small fibrous branches.

21. The stock of a herbaceous perennial, or the lower part of the stem of an annual or perennial, or the lowest branches of a plant, are sometimes underground and assume the appearance of a root. They then take the name of *rhizome.* The rhizome may always be distinguished from the true root by the presence or production of one or more buds, or leaves, or scales.

§ 3. *The Stock.*

22. The **Stock** of a herbaceous perennial, in its most complete state, includes a small portion of the summits of the previous year's roots, as well as of the base of the previous year's stems. . Such stocks will increase yearly, so as at length to form dense tufts. They will often preserve through the winter a few leaves, amongst which are placed the buds which grow out into stems the following year, whilst the under side of the stock emits new roots from or amongst the remains of the old ones. These perennial stocks only differ from the permanent base of an undershrub in the shortness of the perennial part of the stems and in the texture usually less woody.

23. In some perennials, however, the stock consists merely of a branch, which proceeds in autumn from the base of the stem either aboveground or underground, and produces one or more buds. This branch, or a portion of it, alone survives the winter. In the following year its buds produce the new stem and roots, whilst the rest of the plant, even the branch on which these buds were formed, has died away. These *annual stocks,* called sometimes *hybernacula, offsets,* or *stolons,* keep up the communication between the annual stem and root of one year and those of the following year, thus forming altogether a perennial plant.

24. The stock, whether annual or perennial, is often entirely underground or root-like. This is the *rootstock,* to which some botanists limit the meaning of the term *rhizome.* When the stock is entirely root-like, it is popularly called the *crown* of the root.

25. The term *tuber* is applied to a short, thick, more or less succulent rootstock or rhizome, as well as to a root of that shape (20), although some botanists propose to restrict its meaning to the one or to the other. An Orchis tuber, called by some a *knob,* is an annual tuberous rootstock with one bud at the top. A potato is an annual tuberous rootstock with several buds.

26. A *bulb* is a stock of a shape approaching to globular, usually rather conical above and flattened underneath, in which the bud or buds are concealed, or nearly so, under *scales.* These scales are the more or less thickened bases of the decayed leaves of the preceding year, or of the undeveloped leaves of the future year, or of both. Bulbs are annual or perennial, usually underground or close to the ground, but occasionally buds in the axils of the upper leaves become transformed into bulbs. Bulbs are said to be *scaly* when their scales are thick and loosely imbricated, *tunicated* when the scales are thinner, broader, and closely rolled round each other in concentric layers.

27. A *corm* is a tuberous rootstock, usually annual, shaped like a bulb, but in which the bud or buds are not covered by scales, or of which the scales are very thin and membranous.

§ 4. *The Stem.*

28. **Stems** are

erect, when they ascend perpendicularly from the root or stock; *twiggy* or *virgate,* when at the same time they are slender, stiff, and scarcely branched.

sarmentose, when the branches of a woody stem are long and weak, although scarcely climbing.

decumbent or *ascending*, when they spread horizontally, or nearly so, at the base, and then turn upwards and become erect.

procumbent, when they spread along the ground the whole or the greater portion of their length; *diffuse*, when at the same time very much and rather loosely branched.

prostrate, when they lie still closer to the ground.

creeping, when they emit roots at their nodes. This term is also frequently applied to any rhizomes or roots which spread horizontally.

tufted or *cæspitose*, when very short, close, and many together from the same stock.

29. Weak climbing stems are said to *twine*, when they support themselves by winding spirally round any object; such stems are also called *voluble*. When they simply climb without twining, they support themselves by their leaves, or by special clasping organs called *tendrils* (169), or sometimes, like the Ivy, by small root-like excrescences.

30. *Suckers* are young plants formed at the end of creeping, underground rootstocks. *Scions*, *runners*, and *stolons*, or *stoles*, are names given to young plants formed at the end or at the nodes (31) of branches or stocks creeping wholly or partially aboveground, or sometimes to the creeping stocks themselves.

31. A *node* is a point of the stem or its branches at which one or more leaves, branches, or leaf-buds (16) are given off. An *internode* is the portion of the stem comprised between two nodes.

32. **Branches** or **leaves** are

opposite, when two proceed from the same node on opposite sides of the stem.

whorled or *verticillate* (in a *whorl* or *vertical*), when several proceed from the same node, arranged regularly round the stem; *geminate*, *ternate*, *fascicled*, or *fasciculate* when two, three, or more proceed from the same node on the same side of the stem. A tuft of fasciculate leaves is usually in fact a leafy branch, so short that the leaves appear to proceed all from the same point.

alternate, when one only proceeds from each node, one on one side and the next above or below, though usually not in the same vertical line.

decussate, when opposite, but each pair placed at right-angles to the next pair above or below it; *distichous*, when regularly arranged one above another in two opposite rows, one on each side of the stem; *tristichous*, when in three rows, etc. (92).

scattered, when irregularly arranged round the stem; frequently, however, botanists apply the term *alternate* to all branches or leaves that are neither opposite nor whorled.

secund, when all start from or are turned to one side of the stem.

33. **Branches** are *dichotomous*, when several times forked, the two branches of each fork being nearly equal; *trichotomous*, when there are three nearly equal branches at each division instead of two; but when the middle branch is evidently the principal one, the stem is usually said to have two opposite branches; *umbellate*, when divided in the same manner into several nearly equal branches proceeding from the same point. If however the central branch is larger than the two or more lateral ones, the stem is said to have opposite or whorled branches, as the case may be.

34. A *culm* is a name sometimes given to the stem of Grasses, Sedges, and some other Monocotyledonous plants.

§ 5. *The Leaves.*

35. The ordinary or perfect **Leaf** consists of a flat *blade* or *lamina*, usually green, and more or less horizontal, attached to the stem by a stalk called a *footstalk* or *petiole*. When the form or dimensions of a leaf are spoken of, it is generally the blade that is meant, without the petiole or stalk.

36. The end by which a leaf, a part of the flower, a seed, or any other organ, is attached to the stem or other organ, is called its *base*, the opposite end is its *apex* or summit, excepting sometimes in the case of anther-cells (115).

37. **Leaves** are

sessile, when the blade rests on the stem without the intervention of a petiole.

amplexicaul or *stem-clasping*, when the sessile base of the blade clasps the stem horizontally.

perfoliate, when the base of the blade not only clasps the stem, but closes round it on the opposite side, so that the stem appears to pierce through the blade.

decurrent, when the edges of the leaf are continued down the stem so as to form raised lines or narrow appendages, *called wings*.

sheathing, when the base of the blade, or of the more or less expanded petiole, forms a vertical sheath round the stem for some distance above the node.

38. Leaves and flowers are called *radical*, when inserted on a rhizome or stock, or so close to the base of the stem as to appear to proceed from the root, rhizome, or stock; *cauline*, when inserted on a distinct stem. Radical leaves are *rosulate* when they spread in a circle on the ground.

39. **Leaves** are

simple and *entire*, when the blade consists of a single piece, with the margin nowhere indented, *simple* being used in opposition to *compound*, *entire* in opposition to *dentate*, *lobed*, or *divided*.

ciliate, when bordered with thick hairs or fine hair-like teeth.

dentate or *toothed*, when the margin is only cut a little way in, into what have been compared to teeth. Such leaves are *serrate*, when the teeth are regular and pointed like the teeth of a saw; *crenate*, when regular and blunt or rounded (compared to the battlements of a tower); *serrulate*, and *crenulate*, when the serratures or crenatures are small; *sinuate*, when the teeth are broad, not deep, and irregular (compared to bays of the coast); *wavy* or *undulate*, when the edges are not flat, but bent up and down (compared to the waves of the sea).

lobed or *cleft*, when more deeply indented or divided, but so that the incisions do not reach the midrib or petiole. The portions thus divided take the name of *lobes*. When the lobes are narrow and very irregular, the leaves are said to be *laciniate*. The spaces between the teeth or lobes are called *sinuses*.

divided or *dissected*, when the incisions reach the midrib or petiole, but the parts so divided off, called *segments*, do not separate from the petiole, even when the leaf falls, without tearing.

compound, when divided to the midrib or petiole, and the parts so divided off, called *leaflets*, separate, at least at the fall of the leaf, from the petiole, as the whole leaf does from the stem, without tearing. The common stalk upon which the leaflets are inserted is called the *common petiole* or the *rhachis*; the separate stalk of each leaflet is a *petiolule*.

40. Leaves are more or less marked by *veins*, which, starting from the stalk, diverge or branch as the blade widens, and spread all over it more or less visibly. The principal ones, when prominent, are often called *ribs* or *nerves*, the smaller branches only then retaining the name of *veins*, or the latter are termed *veinlets*. The smaller veins are often connected together like the meshes of a net, they are then said to *anastomose*, and the leaf is said to be *reticulate* or *net-veined*. When one principal vein runs direct from the stalk towards the summit of the leaf, it is called the *midrib*. When several start from the stalk, diverge slightly without branching, and converge again towards the summit, they are said to be *parallel*, although not mathematically so. When 3 or 5 or more ribs or nerves diverge *from the base*, the leaf is said to be 3-*nerved*, 5-*nerved*, etc., but if the lateral ones diverge from the midrib a little above the base, the leaf is, *triplinerved*, *quintuplinerved*, etc. The arrangement of the veins of a leaf is called their *venation*.

41. The **Leaflets, Segments, Lobes,** or **Veins** of leaves are

pinnate (feathered), when there are several succeeding each other on each side of the midrib or petiole, compared to the branches of a feather. A pinnately lobed or divided leaf is called *lyrate* when the terminal lobe or segment is much larger and broader than the lateral ones, compared, by a stretch of imagination, to a lyre; *runcinate*, when the lateral lobes are curved backwards towards the base of the leaf; *pectinate*, when the lateral lobes are numerous, narrow, and regular, like the teeth of a comb.

palmate or *digitate*, when several diverge from the same point, compared to the fingers of the hand.

ternate, when three only start from the same point, in which case the distinction between the palmate and pinnate arrangement often ceases, or can only be determined by analogy with allied plants. A leaf with ternate lobes is called *trifid.* A leaf with three leaflets is sometimes improperly called a ternate leaf: it is the leaflets that are ternate; the whole leaf is *trifoliolate.* Ternate leaves are leaves growing three together.

pedate, when the division is at first ternate, but the two outer branches are forked, the outer ones of each fork again forked, and so on, and all the branches are near together at the base, compared vaguely to the foot of a bird.

42. Leaves with pinnate, palmate, pedate, etc., leaflets, are usually for shortness called *pinnate, palmate, pedate,* etc., *leaves.* If they are so cut into segments only, they are usually said to be *pinnatisect, palmatisect, pedatisect,* etc., although the distinction between segments and leaflets is often unheeded in descriptions, and cannot indeed always be ascertained. If the leaves are so cut only into lobes, they are said to be *pinnatifid, palmatifid, pedatifid,* etc.

43. The teeth, lobes, segments, or leaflets may be again toothed, lobed, divided, or compounded. Some leaves are even three or more times divided or compounded. In the latter case they are termed *decompound.* When twice or thrice pinnate (*bipinnate* or *tripinnate*), each primary or secondary division, with the leaflets it comprises, is called a *pinna.* When the pinna of a leaf or the leaflets of a pinna are in pairs, without an odd terminal pinna or leaflet, the leaf or pinna so divided is said to be *abruptly pinnate;* if there is an odd terminal pinna or leaflet, the leaf or pinna is *unequally pinnate* (*imparipinnatum*).

44. The number of leaves or their parts is expressed adjectively by the following numerals, derived from the Latin:—

uni-,	bi-,	tri-,	quadri-,	quinque-,	sex-,	septem-,	octo-,	novem-,	decem-,	multi-,
1-,	2-,	3-,	4-,	5-,	6-,	7-,	8-,	9-,	10-,	*many-*

prefixed to a termination, indicating the particular kind of part referred to. Thus—

unidentate, bidentate, multidentate, mean one-toothed, two-toothed, many-toothed, etc.

bifid, trifid, multifid, mean two-lobed, three-lobed, many-lobed, etc.

unifoliolate, bifoliolate, multifoliolate, mean having one leaflet, two leaflets, many leaflets, etc.

unifoliate, bifoliate, multifoliate, mean having one leaf, two leaves, many leaves, etc.

biternate and *triternate,* mean twice or thrice ternately divided.

unijugate, bijugate, multijugate, etc., pinnæ or leaflets, mean that they are in one, two, many, etc., pairs (*juga*).

45. **Leaves** or their parts, when **flat,** or any other flat organs in plants, are

linear, when long and narrow, at least four or five times as long as broad, falsely compared to a mathematical line, for a linear leaf has always a perceptible breadth.

lanceolate, when about three or more times as long as broad, broadest below the middle, and tapering towards the summit, compared to the head of a lance.

cuneate, when broadest above the middle, and tapering towards the base, compared to a wedge with the point downwards; when very broadly cuneate and rounded at the top, it is often called *flabelliform* or *fan-shaped.*

spathulate, when the broad part near the top is short, and the narrow tapering part long, compared to a spathula or flat ladle.

ovate, when scarcely twice as long as broad, and rather broader below the middle, compared to the longitudinal section of an egg; *obovate* is the same form, with the broadest part above the middle.

deltoid, triangular, in the form of the Greek letter Δ.

orbicular, oblong, elliptical, rhomboidal, etc., when compared to the corresponding mathematical figures.

transversely oblong, or *oblate,* when conspicuously broader than long.

falcate, when curved like the blade of a scythe.

46. Intermediate forms between any two of the above are expressed by combining two terms. Thus, a *linear-lanceolate* leaf is long and narrow, yet broader below the middle, and tapering to a point; a *linear-oblong* one is scarcely narrow enough to be called linear, yet too narrow to be strictly oblong, and does not conspicuously taper either towards the summit or towards the base.

47. The *apex* or *summit* of a leaf is

acute or *pointed*, when it forms an acute angle or tapers to a point.

obtuse or *blunt*, when it forms a very obtuse angle, or more generally when it is more or less rounded at the top.

acuminate or *cuspidate*, when suddenly narrowed at the top, and then more or less prolonged into an *acumen* or *point*, which may be acute or obtuse, linear or tapering. Some botanists make a slight difference between the *acuminate* and *cuspidate* apex, the acumen being more distinct from the rest of the leaf in the latter case than in the former; but in general the two terms are used in the same sense, some preferring the one and some the other.

truncate, when the end is cut off square.

retuse, when very obtuse or truncate, and slightly indented.

emarginate or *notched*, when more decidedly indented at the end of the midrib; *obcordate*, if at the same time approaching the shape of a heart with its point downwards.

mucronate, when the midrib is produced beyond the apex in the form of a small point.

aristate, when the point is fine like a hair.

48. The base of the leaf is liable to the same variations of form as the apex, but the terms more commonly used are *tapering* or *narrowed* for acute and acuminate, *rounded* for obtuse, and *cordate* for emarginate. In all cases the petiole or point of attachment prevent any such absolute termination at the base as at the apex.

49. A leaf may be *cordate* at the base whatever be its length or breadth, or whatever the shape of the two lateral lobes, called *auricles* (or *little ears*), formed by the indenture or notch, but the term *cordiform* or *heart-shaped* leaf is restricted to an ovate and acute leaf, cordate at the base, with rounded auricles. The word auricles is more particularly used as applied to sessile and stem-clasping leaves.

50. If the auricles are pointed, the leaf is more particularly called *auriculate*; it is moreover said to be *sagittate*, when the points are directed downwards, compared to an arrow-head; *hastate*, when the points diverge horizontally, compared to a halbert.

51. A *reniform* leaf is broader than long, slightly but broadly cordate at the base, with rounded auricles, compared to a kidney.

52. In a *peltate* leaf, the stalk, instead of proceeding from the lower edge of the blade, is attached to the under surface, usually near the lower edge, but sometimes in the very centre of the blade. The peltate leaf has usually several principal nerves radiating from the point of attachment, being, in fact, a cordate leaf, with the auricles united.

53. All these modifications of division and form in the leaf pass so gradually one into the other that it is often difficult to say which term is the most applicable—whether the leaf be toothed or lobed, divided or compound, oblong or lanceolate, obtuse or acute, etc. The choice of the most apt expression will depend on the skill of the describer.

54. **Leaves,** when **solid, Stems, Fruits, Tubers,** and other parts of plants, when not flattened like ordinary leaves, are

setaceous or *capillary*, when very slender like bristles or hairs.

acicular, when very slender, but stiff and pointed like needles.

subulate, when rather thicker and firmer like awls.

linear, when at least four times as long as thick; *oblong*, when from about two to about four times as long as thick, the terms having the same sense as when applied to flat surfaces.

ovoid, when egg-shaped, with the broad end downwards, *obovoid* if the broad end is upwards; these terms corresponding to *ovate* and *obovate* shapes in flat surfaces.

globular or spherical, when corresponding to *orbicular* in a flat surface. *Round* applies to both.

turbinate, when shaped like a top.

conical, when tapering upwards; *obconical*, when tapering downwards, if in both cases a transverse section shows a circle.

pyramidal, when tapering upwards; *obpyramidal*, when tapering downwards, if in both cases a transverse section shows a triangle or polygon.

fusiform, or spindle-shaped, when tapering at both ends; *cylindrical* when not tapering at either end, if in both cases the transverse section shows a circle, or sometimes irrespective of the transverse shape.

terete, when the transverse section is not angular; *trigonous*, *triquetrous*, if the transverse section shows a triangle, irrespective in both cases of longitudinal form.

compressed, when more or less flattened laterally; *depressed*, when more or less flattened vertically, or at any rate at the top; *obcompressed* (in the achenes of *Compositæ*), when flattened from front to back.

articulate or *jointed*, if at any period of their growth (usually when fully formed and approaching their decay, or in the case of fruits when quite ripe) they separate, without tearing, into two or more pieces placed end to end. The joints where they separate are called *articulations*, each separate piece an *article*. The name of *joint* is, in common language, given both to the articulation and the article, but more especially to the former. Some modern botanists, however, propose to restrict it to the article, giving the name of *joining* to the articulation.

didymous, when slightly two-lobed, with rounded obtuse lobes.

moniliform, *torulose*, or beaded, when much contracted at regular intervals, but not separating spontaneously into articles.

55. In their consistence **Leaves** or other organs are

fleshy, when thick and soft; *succulent* is generally used in the same sense, but implies the presence of more juice.

coriaceous, when firm and dry, or very tough, of the consistence of leather.

crustaceous, when firm and brittle.

chartaceous, or *papyraceous*, when of the consistence of paper.

membranous, when thin and not stiff.

scarious or *scariose*, when very thin, more or less transparent and not green, yet rather stiff.

56. The terms applied botanically to the consistence of solids are those in general use in common language.

57. The mode in which unexpanded leaves are disposed in the leaf-bud is called their *vernation* or *præfoliation*; it varies considerably, and technical terms have been proposed to express some of its varieties, but it has been hitherto rarely noticed in descriptive botany.

§ 6. *Scales, Bracts, and Stipules.*

58. **Scales** (*Squamæ*) are leaves very much reduced in size, usually sessile, seldom green or capable of performing the respiratory functions of leaves. In other words, they are organs resembling leaves in their position on the plant, but differing in size, colour, texture, and functions. They are most frequent on the stock of perennial plants, or at the base of annual branches, especially on the buds of future shoots, when they serve apparently to protect the dormant living germ from the rigour of winter. In the latter case they are usually short, broad, close together, and more or less *imbricated*, that is, overlapping each other like the tiles of a roof. It is this arrangement as well as their usual shape that has suggested the name of *scales*, borrowed from the scales of a fish. Imbricated scales, bracts, or leaves, are said to be *squarrose*, when their tips are pointed and very spreading or recurved.

59. Sometimes, however, most or all the leaves of the plant are reduced to small scales, in which case they do not appear to perform any particular function. The name of *scales* is also given to any small broad scale-like appendages or reduced organs, whether in the flower or any other part of the plant.

60. **Bracts** (*Bracteæ*) are the upper leaves of a plant in flower (either all those of the flowering branches, or only one or two immediately under the flower), when different from the stem-leaves in size, shape, colour, or arrangement. They are generally much smaller and more sessile. They often partake of the colour of the flower, although they very frequently also retain the green colour of the leaves. When small they are often called *scales*.

61. *Floral leaves* or *leafy bracts* are generally the lower bracts or the upper leaves at the base of the flowering branches, intermediate in size, shape, or arrangement, between the stem-leaves and the upper bracts.

62. *Bracteoles* are the one or two last bracts under each flower, when they differ materially in size, shape, or arrangement from the other bracts.

63. **Stipules** are leaf-like or scale-like appendages at the base of the leaf-stalk, or on the node of the stem. When present there are generally two, one on each side of the leaf, and they sometimes appear to protect the young leaf before it is developed. They are however exceedingly variable in size and appearance, sometimes exactly like the true leaves except that they have no buds in their axils, or looking like the leaflets of a compound leaf, sometimes apparently the only leaves of the plant; generally small and narrow, sometimes reduced to minute scales, spots, or scars, sometimes united into one opposite the leaf, or more or less united with, or *adnate* to the petiole, or quite detached from the leaf, and forming a ring or sheath round the stem in the axil of the leaf. In a great number of plants they are entirely wanting.

64. *Stipellæ*, or secondary stipules, are similar organs, sometimes found on compound leaves at the points where the leaflets are inserted.

65. When scales, bracts, or stipules, or almost any part of the plant besides leaves and flowers are stalked, they are said to be *stipitate*, from *stipes*, a *stalk*.

§ 7. *Inflorescence and its Bracts.*

66. The **Inflorescence** of a plant is the arrangement of the flowering branches, and of the flowers upon them. *An Inflorescence*, is a flowering branch, or the flowering summit of a plant above the last stem-leaves with its branches, bracts, and flowers.

67. A single flower, or an inflorescence, is *terminal* when at the summit of a stem or leafy branch, *axillary* when in the axil of a stem-leaf, *leaf-opposed* when opposite to a stem-leaf. The inflorescence of a plant is said to be *terminal* or *determinate* when the main stem and principal branches end in a flower or inflorescence (not in a leaf-bud), *axillary* or *indeterminate* when all the flowers or inflorescences are axillary, the stem or branches ending in leaf-buds.

68. A *Peduncle* is the stalk of a solitary flower, or of an inflorescence; that is to say, the portion of the flowering branch from the last stem-leaf to the flower, or to the first ramification of the inflorescence, or even up to its last ramifications; but the portion extending from the first to the last ramifications or the axis of inflorescence is often distinguished under the name of *rhachis*.

69. A *Scape* or *radical Peduncle* is a leafless peduncle proceeding from the stock, or from near the base of the stem, or apparently from the root itself.

70. A *Pedicel* is the last branch of an inflorescence, supporting a single flower.

71. The branches of inflorescence may be, like those of stems, opposite, alternate, etc. (32, 33), but very often their arrangement is different from that of the leafy branches of the same plant.

72. **Inflorescence** is

centrifugal, when the terminal flower opens first, and those on the lateral branches are successively developed.

centripetal, when the lowest flowers open first, and the main stem continues to elongate, developing fresh flowers.

73. Determinate inflorescence is usually centrifugal. Indeterminate inflorescence is always centripetal. Both inflorescences may be combined on one plant, for it often happens that the main branches of an inflorescence are centripetal, whilst the flowers on the lateral branches are centrifugal; or *vice versâ*.

74. An **Inflorescence** is

a *Spike*, or *spicate*, when the flowers are sessile along a simple undivided axis or rhachis.

a *Raceme*, or *racemose*, when the flowers are borne on pedicels along a single undivided axis or rhachis.

a *Panicle*, or *paniculate*, when the axis is divided into branches bearing two or more flowers.

a *Head*, or *capitate*, when several sessile or nearly sessile flowers are collected into a compact head-like cluster. The short, flat, convex, or conical axis on which the flowers are seated, is called the *receptacle*, a term also used for the torus of a single flower (135). The very compact flower-heads of *Compositæ* are often termed *compound flowers*.

an *Umbel*, or *umbellate*, when several branches or pedicels appear to start from the same point and are nearly of the same length. It differs from the head, like the raceme from the spike, in that the flowers are not sessile. An umbel is said to be *simple*, when each of its branches or *rays* bears a single flower; *compound* when each ray bears a *partial umbel* or *umbellule*.

a *Corymb*, or *corymbose*, when the branches and pedicels, although starting from different points, all attain the same level, the lower ones being much longer than the upper. It is a flat-topped or *fastigiate* panicle.

a *Cyme*, or *cymose*, when branched and centrifugal. It is a centrifugal panicle, and is often corymbose. The central flower opens first. The lateral branches successively developed are usually forked or opposite (dichotomous or trichotomous), but sometimes after the first forking the branches are no longer divided, but produce a succession of pedicels on their upper side forming apparently unilateral centripetal racemes; whereas if attentively examined, it will be found that each pedicel is at first terminal, but becomes lateral by the development of one outer branch only, immediately under the pedicel. Such branches, when in bud, are generally rolled back at the top, like the tail of a scorpion, and are thence called *scorpioid*.

a *Thyrsus*, or *thyrsoid*, when cymes, usually opposite, are arranged in a narrow pyramidal panicle.

75. There are numerous cases where inflorescences are intermediate between some two of the above, and are called by different botanists by one or the other name according as they are guided by apparent or by theoretical similarity. A spike-like panicle, where the axis is divided into very short branches forming a cylindrical compact inflorescence, is called sometimes a spike, sometimes a panicle. If the flowers are in distinct clusters along a simple axis, the inflorescence is described as an *interrupted* spike or raceme, according as the flowers are nearly sessile or distinctly pedicellate; although when closely examined the flowers will be found to be inserted not on the main axis, but on a very short branch, thus, strictly speaking, constituting a panicle.

76. The *catkins* (*amenta*) of *Amentaceæ*, the *spadices* of several Monocotyledons, the *ears* and *spikelets* of Grasses are forms of the spike.

77. **Bracts** are generally placed singly under each branch of the inflorescence, and under each pedicel; bracteoles are usually two, one on each side, on the pedicel or close under the flower, or even upon the calyx itself; but bracts are also frequently scattered along the branches without axillary pedicels; and when the differences between the bracts and bracteoles are trifling or immaterial, they are usually all called bracts.

78. When these bracts appear to proceed from the same point, they will on examination, be found to be really either one bract and two stipules, or one bract with two bracteoles in its axil. When two bracts appear to proceed from the same point, they will usually be found to be the stipules of an undeveloped bract, unless the branches of the inflorescence are opposite, when the bracts will of course be opposite also.

79. When several bracts are collected in a whorl, or are so close together as to appear whorled, or are closely imbricated round the base of a head or umbel, they are collectively called an *Involucre*. The bracts composing an involucre are described under the names of *leaves*, *leaflets*, *bracts*, or *scales*, according to their appearance. *Phyllaries* is a useless term, lately introduced for the bracts or scales of the involucre of *Compositæ*. An *Involucel* is the involucre of a partial umbel.

80. When several very small bracts are placed round the base of a calyx or of an involucre, they have been termed a *calycule*, and the calyx or involucre said to be *calyculate*, but these terms are now falling into disuse, as conveying a false impression. When the bracts are whorled and inserted upon the calyx, they form what is frequently called an *epicalyx*.

81. A *Spatha* is a bract or floral leaf enclosing the inflorescence of some Monocotyledons.

82. *Paleæ*, *pales*, or *Chaff*, are the inner bracts or scales in *Compositæ*, *Gramineæ*, and some other plants, when of a thin yet stiff consistence, usually narrow and of a pale colour.

83. *Glumes* are the bracts enclosing the flowers of *Cyperaceæ* and *Gramineæ*.

§ 8. *The Flower in General.*

84. A *complete* **Flower** (15) is one in which the calyx, corolla, stamens, and pistil are all present; a *perfect* flower, one in which all these organs, or such of them as are present, are capable of performing their several functions. Therefore, properly speaking, an *incomplete* flower is one in which any one or more of these organs is wanting; and an *imperfect* flower, one in which any one or more of these organs is so altered as to be incapable of properly performing its functions. These imperfect organs are said to be *abortive* if much reduced in size or efficiency, *rudimentary* if so much so as to be scarcely perceptible. But in many works, the term *incomplete* is specially applied to those flowers in which the perianth is simple or wanting, and *imperfect* to those in which either the stamens or pistils are imperfect or wanting.

85. A **Flower** is

dichlamydeous, when the perianth is double, both calyx and corolla being present and distinct.

monochlamydeous, when the perianth is single, whether by the union of the calyx and corolla, or the deficiency of either.

asepalous, when there is no calyx.

apetalous, when there is no corolla.

naked, or *achlamydeous*, when there is no perianth at all.

hermaphrodite or *bisexual*, when both stamens and pistil are present and perfect.

male or *staminate*, when there are one or more stamens, but either no pistil at all or an imperfect one.

female or *pistillate*, when there is a pistil, but either no stamens at all, or only imperfect ones.

neuter when both stamens and pistil are imperfect or wanting.

barren or *sterile*, when from any cause it produces no seed.

fertile, when it does produce seed. In some works the terms *barren*, *fertile*, and *perfect*. are also used respectively as synonyms of *male*, *female*, and *hermaphrodite*.[1]

86. The flowers of a plant or species are said collectively to be *unisexual* or *diclinous* when the flowers are all either male or female.

monœcious, when the male and female flowers are distinct, but on the same plant.

diœcious, when the male and female flowers are on distinct plants.

polygamous, when there are male, female, and hermaphrodite flowers on the same or on distinct plants.

87. A head of flowers is *heterogamous* when male, female, hermaphrodite, and neuter flowers, or any two or three of them, are included in one head: *homogamous*, when all the flowers included in one head are alike in this respect. A spike or head of flowers is *androgynous* when male and female flowers are mixed in it. These terms are only used in the case of very few Natural Orders.

88. As the scales of buds are leaves undeveloped or reduced in size and altered in shape and consistence, and bracts are leaves likewise reduced in size, and occasionally altered in colour; so the parts of the flower are considered as leaves still further altered in shape, colour, and arrangement round the axis, and often more or less combined with each other. The details of this theory constitute the comparatively modern branch of botany called *Vegetable Metamorphosis* or *Homology*, sometimes improperly termed *Morphology* (8).

89. To understand the arrangement of the floral parts, let us take a *complete* flower, in which moreover all the parts are *free* from each other, *definite* in number, *i.e.*, always the same in the same species, and *symmetrical* or *isomerous*, *i.e.*, when each whorl consists of the same number of parts.

90. Such a complete symmetrical flower consists usually of either four or five whorls of altered leaves (88), placed immediately one within the other.

The **Calyx** forms the outer whorl. Its parts are called *sepals*.

The **Corolla** forms the next whorl. Its parts, called *petals*, usually *alternate* with the sepals; that is to say, the centre of each petal is immediately over or within the interval between two sepals.

The **Stamens** form one or two whorls within the petals. If two, those of the outer whorl (the *outer stamens*) alternate with the petals, and are consequently opposite to, or over the centre of the sepals; those of the inner whorl (the *inner stamens*) alternate with the outer ones, and are therefore opposite to the petals. If there is only one whorl of stamens, they most frequently alternate with the petals; but sometimes they are opposite the petals and alternate with the sepals.

The **Pistil** forms the inner whorl; its carpels usually alternate with the inner row of stamens.

91. In an axillary or lateral flower the *upper* parts of each whorl (sepals, petals, stamens, or carpels) are those which are next to the main axis of the stems or branch, the *lower* parts those which are furthest from it; the intermediate ones are said to be *lateral.* The words *anterior* (front) and *posterior* (back) are often used for lower and upper respectively, but their meaning is sometimes reversed if the writer supposes himself in the centre of the flower instead of outside of it.

92. The number of parts in each whorl of a flower is expressed adjectively by the following numerals derived from the Greek:—

mono-,	di-,	tri-,	tetra-,	penta-,	hexa-,	hepta-,	octo-.	ennea-,	deca-, etc.,	poly-
1-,	2-,	3-,	4-,	5-,	6-,	7-,	8-,	9-,	10-,	*many-*

prefixed to a termination indicating the whorl referred to.

93. Thus, a **Flower** is

disepalous, trisepalous, tetrasepalous, polysepalous, etc., according as there are 2, 3, 4, or many (or an indefinite number of) sepals.

dipetalous, tripetalous, polypetalous, etc., according as there are 2, 3, or many petals.

diandrous, triandrous, polyandrous, etc., according as there are 2, 3, or many stamens.

digynous, trigynous, polygynous, etc., according as there are 2, 3, or many carpels.

And generally (if symmetrical), *dimerous, trimerous, polymerous,* etc., according as there are 2, 3, or many (or an indefinite number of) parts to each whorl.

94. Flowers are *unsymmetrical* or *anisomerous,* strictly speaking, when any one of the whorls has a different number of parts from any other; but when the carpels alone are reduced in number, the flower is still frequently called symmetrical or isomerous, if the calyx, corolla, and staminal whorls have all the same number of parts.

95. Flowers are *irregular* when the parts of any one of the whorls are unequal in size, dissimilar in shape, or do not spread regularly round the axis at equal distances. It is however more especially irregularity of the corolla that is referred to in descriptions. A slight inequality in size or direction in the other whorls does not prevent the flower being classed as *regular*, if the corolla or perianth is conspicuous and regular.

§ 9. *The Calyx and Corolla, or Perianth.*

96. The **Calyx** (90) is usually green, and smaller than the corolla; sometimes very minute, rudimentary, or wanting, sometimes very indistinctly whorled, or not whorled at all, or in two whorls, or composed of a large number of sepals, of which the outer ones pass gradually into bracts, and the inner ones into petals.

97. The **Corolla** (90) is usually coloured, and of a more delicate texture than the calyx, and, in popular language, is often more specially meant by the *flower.* Its petals are more rarely in two whorls, or indefinite in number, and the whorl more rarely broken than in the case of the calyx, at least when the plant is in a natural state. *Double flowers* are in most cases an accidental deformity or monster in which the ordinary number of petals is multiplied by the conversion of stamens, sepals, or even carpels into petals, by the division of ordinary petals, or simply by the addition of supernumerary ones. Petals are also sometimes very small, rudimentary, or entirely deficient.

98. In very many cases, a so-called *simple perianth* (15) (of which the parts are usually called *leaves* or *segments*) is one in which the sepals and petals are similar in form and texture, and present apparently a single whorl. But if examined in the young bud, one half of the parts will generally be found to be placed outside the other half, and there will frequently be some slight difference in texture, size, and colour, indicating to the close observer the presence of both calyx and corolla.

Hence much discrepancy in descriptive works. Where one botanist describes a simple perianth of six segments, another will speak of a double perianth of three sepals and three petals.

99. The following terms and prefixes, expressive of the modifications of form and arrangement of the corolla and its petals, are equally applicable to the calyx and its sepals, and to the simple perianth and its segments.

100. The Corolla is said to be *monopetalous* when the petals are united, either entirely or at the base only, into a cup, tube, or ring; *polypetalous* when they are all free from the base. These expressions, established by a long usage, are not strictly correct, for *monopetalous* (consisting of a single petal) should apply rather to a corolla really reduced to a single petal, which would then be on one side of the axis; and *polypetalous* is sometimes used more appropriately for a corolla with an indefinite number of petals. Some modern botanists have therefore proposed the term *gamopetalous* for the corolla with united petals, and *dialypetalous* for that with free petals; but the old established expressions are still the most generally used.

101. When the petals are partially united, the lower entire portion of the corolla is called the *tube*, whatever be its shape, and the free portions of the petals are called the *teeth*, *lobes*, or *segments* (39), according as they are short or long in proportion to the whole length of the corolla. When the tube is excessively short, the petals appear at first sight free, but their slight union at the base must be carefully attended to, being of importance in classification.

102. The **Æstivation** of a corolla is the arrangement of the petals, or of such portion of them as is free, in the unexpanded bud. It is

valvate, when they are strictly whorled in their whole length, their edges being placed against each other without overlapping. If the edges are much inflexed, the æstivation is at the same time *induplicate; involute*, if the margins are rolled inward; *reduplicate*, if the margins project outwards into salient angles; *revolute*, if the margins are rolled outwards; *plicate*, if the petals are folded in longitudinal plaits.

imbricate, when the whorl is more or less broken by some of the petals being outside the others, or by their overlapping each other at least at the top. Five-petaled imbricate corollas are *quincuncially* imbricate when one petal is outside, and an adjoining one wholly inside, the three others intermediate and overlapping on one side; *bilabiate*, when two adjoining ones are inside or outside the three others. Imbricate petals are described as *crumpled* (*corrugate*) when puckered irregularly in the bud.

twisted, *contorted*, or *convolute*, when each petal overlaps an adjoining one on one side, and is overlapped by the other adjoining one on the other side. Some botanists include the twisted æstivation in the general term *imbricate;* others carefully distinguish the one from the other.

103. In a few cases the overlapping is so slight that the three æstivations cannot easily be distinguished one from the other; in a few others the æstivation is variable, even in the same species, but, in general, it supplies a constant character in species, in genera, or even Natural Orders.

104. In general shape the **Corolla** is

tubular, when the whole or the greater part of it is in the form of a tube or cylinder.

campanulate, when approaching in some measure the shape of a cup or bell.

urceolate, when the tube is swollen or nearly globular, contracted at the top, and slightly expanded again in a narrow rim.

rotate or *stellate*, when the petals or lobes are spread out horizontally from the base, or nearly so, like a wheel or star.

hypocrateriform or *salver-shaped*, when the lower part is cylindrical and the upper portion expanded horizontally. In this case the name of *tube* is restricted to the cylindrical part, and the horizontal portion is called the *limb*, whether it be divided to the base or not. The orifice of the tube is called its *mouth* or *throat*.

infundibuliform or *funnel-shaped*, when the tube is cylindrical at the base, but enlarged at the top into a more or less campanulate limb, of which the lobes often spread horizontally. In this case the campanulate part, up to the commencement of the lobes, is sometimes considered as a portion of the tube, sometimes as a portion of the limb, and by some botanists again described as independent of either, under the name of *throat* (*fauces*). Generally speaking, however, in campanulate, infundibuliform, or other corollas, where the lower entire part passes gradually into the upper divided and more spreading part, the distinction between the *tube* and the *limb* is drawn either at the point where the lobes separate, or at the part where the corolla first expands, according to which is the most marked.

105. Irregular corollas have received various names according to the more familiar forms they have been compared to. Some of the most important are the

bilabiate, or *two-lipped* corolla, when, in a four- or five-lobed corolla, the two or three upper lobes stand obviously apart, like an *upper lip*, from the two or three lower ones or *under lip*. In *Orchideæ* and some other families the name of lip, or *labellum*, is given to one of the divisions or lobes of the perianth.

personate, when two-lipped, and the orifice of the tube closed by a projection from the base of the upper or lower lip, called a *palate*.

ringent, when very widely two-lipped, and the orifice of the tube very open.

spurred, when the tube or the lower part of a petal has a conical hollow projection, compared to the spur of a cock; *saccate*, when the spur is short and round like a little bag; *gibbous*, when projecting at any part into a slight swelling; *foveolate*, when marked in any part with a slight glandular or thickened cavity.

resupinate or *reversed*, when a lip, spur, etc., which in allied species is usually lowest, lies uppermost, and *vice versâ*.

106. The above terms are mostly applied to the forms of monopetalous corollas, but several are also applicable to those of polypetalous ones. Terms descriptive of the special forms of corolla in certain Natural Orders, will be explained under those Orders respectively.

107. Most of the terms used for describing the forms of leaves (39, 45) are also applicable to those of individual petals; but the flat expanded portion of a petal, corresponding to the blade of the leaf, is called its *lamina*, and the stalk, corresponding to the petiole, its *claw* (*unguis*). The stalked petal is said to be *unguiculate*.

§ 10. *The Stamens.*

108. Although in a few cases the outer stamens may gradually pass into petals, yet, in general, **Stamens** are very different in shape and aspect from leaves, sepals or petals. It is only in a theoretical point of view (not the less important in the study of the physiological economy of the plant) that they can be called altered leaves.

109. This usual form is a stalk, called the *filament*, bearing at the top an *anther* divided into two pouches or *cells*. These anther-cells are filled with *pollen*, consisting of minute grains, usually forming a yellow dust, which, when the flower expands, is scattered from an opening in each cell. When the two cells are not closely contiguous, the portion of the anther that unites them is called the *connectivum*.

110. The filament is often wanting, and the anther sessile, yet still the stamen is perfect; but if the anther, which is the essential part of the stamen, is wanting, or does not contain pollen, the stamen is imperfect, and is then said to be *barren* or *sterile* (without pollen), *abortive*, or *rudimentary* (84), according to the degree to which the imperfection is carried. Imperfect stamens are often called *staminodia*.

111. In unsymmetrical flowers, the stamens of each whorl are sometimes reduced in number below that of the petals, even to a single one, and in several Natural Orders they are multiplied indefinitely.

112. The terms *monandrous* and *polyandrous* are restricted to flowers which have really but one stamen, or an indefinite number respectively. Where several stamens are united into one, the flower is said to be *synandrous*.

113. **Stamens** are

monadelphous, when united by their filaments into one cluster. This cluster either forms a tube round the pistil, or, if the pistil is wanting, occupies the centre of the flower.

diadelphous, when so united into two clusters or *phalanges*. The term is more especially applied to certain *Leguminosæ*, in which nine stamens are united in a tube slit open on the upper side, and a tenth, placed in a slit, is free. In some other plants the stamens are equally distributed in the two clusters.

triadelphous, *pentadelphous*, *polyadelphous*, when so united into three, five, or many clusters or *phalanges*.

syngenesious, when united by their anthers in a ring round the pistil, the filaments usually remaining free.

didynamous, when (usually in a bilabiate flower) there are four stamens in two pairs, those of one pair longer than those of the other.

tetradynamous, when (in *Cruciferæ*) there are six, four of them longer than the two others.

exserted, when longer than the corolla, or even when longer than its tube, if the limb be very spreading.

114. An **Anther** (109) is

adnate, when continuous with the filament, the anther-cells appearing to lie their whole length along the upper part of the filament.

innate, when firmly attached by their base to the filament. This is an adnate anther when rather more distinct from the filament.

versatile, when attached by their back to the very point of the filament, so as to swing loosely.

115. Anther-cells may be *parallel* or *diverging* at a less or greater angle; or *divaricate*, when placed end to end so as to form one straight line. The end of each anther-cell placed nearest to the other cell is generally called its *apex* or *summit*, and the other end its *base* (36); but some botanists reverse the sense of these terms.

116. Anthers have often, on their connectivum or cells, appendages termed *bristles* (setæ), *spurs*, *crests*, *points*, *glands*, etc., according to their appearance.

117. Anthers have occasionally only one cell: this may take place either by the disappearance of the partition between two closely contiguous cells, when these cells are said to be *confluent*; or by the abortion or total deficiency of one of the cells, when the anther is said to be *dimidiate*.

118. Anthers will open or *dehisce* to let out the pollen, like capsules, in *valves*, *pores*, or *slits*. Their dehiscence is *introrse*, when the opening faces the pistil; *extrorse*, when towards the circumference of the flower.

119. Pollen (109) is not always in the form of dust. It is sometimes collected in each cell into one or two little wax-like masses. Special terms used in describing these masses or other modifications of the pollen will be explained under the Orders where they occur.

§ 11. *The Pistil.*

120. The carpels (91) of the **Pistil,** although they may occasionally assume, rather more than stamens, the appearance and colour of leaves, are still more different in shape and structure. They are usually sessile; if stalked, their stalk is called a *podocarp*. This stalk, upon which each separate carpel is supported above the receptacle, must not be confounded with the *gynobasis* (143), upon which the whole pistil is sometimes raised.

121. Each carpel consists of three parts:

1. the **Ovary,** or enlarged base, which includes one or more cavities or *cells*, containing one or more small bodies called *ovules*. These are the earliest condition of the future seeds.

2. the **Style,** proceeding from the summit of the ovary, and supporting—

3. the **Stigma,** which is sometimes a point (or *punctiform* stigma) or small head (a *capitate* stigma) at the top of the style or ovary, sometimes a portion of its surface more or less lateral and variously shaped, distinguished by a looser texture, and covered with minute protuberances called *papillæ*.

122. The style is often wanting, and the stigma is then sessile on the ovary, but in the perfect pistil there is always at least one ovule in the ovary, and some portion of stigmatic surface. Without these the pistil is imperfect, and said to be *barren* (not setting seed), *abortive*, or *rudimentary* (84), according to the degree of imperfection.

123. The ovary being the essential part of the pistil, most of the terms relating to the number, arrangement, etc., of the carpels, apply specially to their ovaries. In some works each separate carpel is called a pistil, all those of a flower consti-

tuting together the *gynæceum;* but this term is in little use, and the word *pistil* is more generally applied in a collective sense. When the ovaries are at all united, they are commonly termed collectively a compound ovary.

124. The number of carpels or ovaries in a flower is frequently reduced below that of the parts of the other floral whorls, even in flowers otherwise symmetrical. In a very few genera, however, the ovaries are more numerous than the petals, or indefinite. They are in that case either arranged in a single whorl, or form a head or spike in the centre of the flower.

125. The terms *monogynous, digynous, polygynous,* etc. (with a pistil of one. two, or more parts), are vaguely used, applying sometimes to the whole pistil, sometimes to the ovaries alone, or to the styles or stigmas only. Where a more precise nomenclature is adopted, the flower is

monocarpellary, when the pistil consists of a single simple carpel.

bi-, tri-, etc., to *poly-carpellary,* when the pistil consists of two, three, or an indefinite number of carpels, whether separate or united.

syncarpous, when the carpels or their ovaries are more or less united into one compound ovary.

apocarpous, when the carpels or ovaries are all free and distinct.

126. A *compound* ovary is

unilocular or *one-celled,* when there are no partitions between the ovules, or when these partitions do not meet in the centre so as to divide the cavity into several cells.

plurilocular or *several-celled,* when completely divided into two or more cells by partitions called *dissepiments* (*septa*), usually vertical and radiating from the centre or axis of the ovary to its circumference.

bi-, tri-, etc., to *multi-locular,* according to the number of these cells, two, three, etc., or many.

127. In general the number of cells or of dissepiments, complete or partial, or of rows of ovules, corresponds with that of the carpels, of which the pistil is composed. But sometimes each carpel is divided completely or partially into two cells, or has two rows of ovules, so that the number of carpels appears double what it really is. Sometimes again the carpels are so completely combined and reduced as to form a single cell, with a single ovule, although it really consists of several carpels. But in these cases the ovary is usually described as it appears, as well as such as it is theoretically supposed to be.

128. In apocarpous pistils the styles are usually free, each bearing its own stigma. Very rarely the greater part of the styles, or the stigmas alone, are united, whilst the ovaries remain distinct.

129. Syncarpous pistils are said to have

several styles, when the styles are free from the base.

one style, with several branches, when the styles are connected at the base, but separate below the point where the stigmas or stigmatic surfaces commence.

one simple style, with several stigmas, when united up to the point where the stigmas or stigmatic surfaces commence and then separating.

one simple style, with a branched, lobed, toothed, notched, or entire stigma (as the case may be), when the stigmas also are more or less united. In many works, however, this precise nomenclature is not strictly adhered to, and considerable confusion is often the result.

130. In general the number of styles, or branches of the style or stigma, is the same as that of the carpels, but sometimes that number is doubled, especially in the stigmas, and sometimes the stigmas are dichotomously or pinnately branched, or *penicillate,* that is, divided into a tuft of hair-like branches. All these variations sometimes make it a difficult task to determine the number of carpels forming a compound ovary, but the point is of considerable importance in fixing the affinities of plants, and, by careful consideration, the real as well as the apparent number has now in most cases been agreed upon.

131. The *Placenta* is the part of the inside of the ovary to which the ovules are attached, sometimes a mere point or line on the inner surface, often more or less thickened or raised. *Placentation* is therefore the indication of the part of the ovary to which the ovules are attached.

132. Placentas are

axile, when the ovules are attached to the axis or centre, that is, in plurilocular ovaries, when they are attached to the inner angle of each cell; in unilocular simple ovaries, which have almost always an excentrical style or stigma, when the ovules are attached to the side of the ovary nearest to the style; in unilocular compound ovaries, when the ovules are attached to a central protuberance, column, or axis rising up from the base of the cavity. If this column does not reach the top of the cavity, the placenta is said to be *free* and *central*.

parietal, when the ovules are attached to the inner surface of the cavity of a one-celled compound ovary. Parietal placentas are usually slightly thickened or raised lines, sometimes broad surfaces nearly covering the inner surface of the cavity, sometimes projecting far into the cavity, and constituting partial dissepiments, or even meeting in the centre, but without cohering there. In the latter case the distinction between the one-celled and the several-celled ovary sometimes almost disappears.

133. Each **Ovule** (121), when fully formed, usually consists of a central mass or *nucleus* enclosed in two bag-like *coats*, the outer one called *primine*, the inner one *secundine*. The *chalaza* is the point of the ovule at which the base of the nucleus is confluent with the coats. The *foramen* is a minute aperture in the coats over the *apex* of the nucleus.

134. **Ovules** are

orthotropous or *straight*, when the chalaza coincides with the base (36) of the ovule, and the foramen is at the opposite extremity, the axis of the ovule being straight.

campylotropous or *incurved*, when the chalaza still coinciding with the base of the ovule, the axis of the ovule is curved, bringing the foramen down more or less towards that base.

anatropous or *inverted*, when the chalaza is at the apex of the ovule, and the foramen next to its base, the axis remaining straight. In this, one of the most frequent forms of the ovule, the chalaza is connected with the base by a cord, called *rhaphe*, adhering to one side of the ovule, and becoming more or less incorporated with its coats, as the ovule enlarges into a seed.

amphitropous or *half-inverted*, when the ovule being as it were attached laterally, the chalaza and foramen at opposite ends of its straight or curved axis are about equally distant from the base or point of attachment.

§ 12. *The Receptacle and Relative Attachment of the Floral Whorls.*

135. The **Receptacle** or *torus* is the extremity of the peduncle (above the calyx), upon which the corolla, stamens, and ovary are inserted. It is sometimes little more than a mere point or minute hemisphere, but it is often also more or less elongated, thickened, or otherwise enlarged. It must not be confounded with the receptacle of inflorescence (74).

136. A *Disk*, or *disc*, is a circular enlargement of the receptacle, usually in the form of a cup (*cupular*), of a flat disk or quoit, or of a cushion (*pulvinate*). It is either immediately at the base of the ovary within the stamens, or between the petals and stamens, or bears the petals or stamens or both on its margin, or is quite at the extremity of the receptacle, with the ovaries arranged in a ring round it or under it.

137. The disk may be *entire*, or *toothed*, or *lobed*, or *divided* into a number of parts, usually equal to, or twice that of the stamens or carpels. When the parts of the disk are quite separate and short, they are often called *glands*.

138. *Nectaries* are either the disk, or small deformed petals, or abortive stamens, or appendages at the base of petals, or stamens, or any small bodies within the flower which do not look like petals, stamens, or ovaries. They were formerly supposed to supply bees with their honey, and the term is frequently to be met with in the older Floras, but is now deservedly going out of use.

139. When the disk bears the petals and stamens, it is frequently adherent to, and apparently forms part of, the tube of the calyx, or it is adherent to, and apparently forms part of, the ovary, or of both calyx-tube and ovary. Hence the three following important distinctions in the relative insertion of the floral whorls.

140. *Petals*, or as it is frequently expressed, flowers, are

hypogynous (*i.e.*, under the ovary), when they or the disk that bears them are entirely free both from the calyx and ovary. The ovary is then described as *free* or *superior*, the calyx as *free* or *inferior*, the petals as being *inserted on the receptacle.*

perigynous (*i.e.*, round the ovary), when the disk bearing the petals is quite free from the ovary, but is more or less combined with the base of the calyx-tube. The ovary is then still described as *free* or *superior*, even though the combined disk and calyx-tube may form a deep cup with the ovary lying in the bottom; the calyx is said to be *free* or *inferior*, and the petals are described as *inserted on the calyx.*

epigynous (*i.e.*, upon the ovary), when the disk bearing the petals is combined both with the base of the calyx-tube and the base outside of the ovary; either closing over the ovary so as only to leave a passage for the style, or leaving more or less of the top of the ovary free, but always adhering to it above the level of the insertion of the lowest ovule (except in a very few cases where the ovules are absolutely suspended from the top of the cell). In epigynous flowers the ovary is described as *adherent* or *inferior*, the calyx as *adherent* or *superior*, the petals as *inserted on* or *above the ovary*. In some works, however, most epigynous flowers are included in the perigynous ones, and a very different meaning is given to the term *epigynous* (144), and there are a few cases where no positive distinction can be drawn between the epigynous and perigynous flowers, or again between the perigynous and hypogynous flowers.

141. When there are no petals, it is the insertion of the stamens that determines the difference between the hypogynous, perigynous, and epigynous flowers.

142. When there are both petals and stamens,

in hypogynous flowers, the petals and stamens are usually free from each other, but sometimes they are combined at the base. In that case, if the petals are distinct from each other, and the stamens are monadelphous, the petals are often said to be *inserted on* or *combined with the staminal tube;* if the corolla is gamopetalous and the stamens distinct from each other, the latter are said to be *inserted in the tube of the corolla.*

in perigynous flowers, the stamens are usually inserted immediately within the petals, or alternating with them on the edge of the disk, but occasionally much lower down within the disk, or even on the unenlarged part of the receptacle.

in epigynous flowers, when the petals are distinct, the stamens are usually inserted as in perigynous flowers; when the corolla is gamopetalous, the stamens are either free and epigynous, or combined at the base with (inserted in) the tube of the corolla.

143. When the receptacle is distinctly elongated below the ovary, it is often called a *gynobasis*, *gynophore*, or *stalk of the ovary.* If the elongation takes place below the stamens or below the petals, these stamens or petals are then said to be *inserted on the stalk of the ovary*, and are occasionally, but falsely, described as *epigynous.* Really epigynous stamens (*i.e.*, when the filaments are combined with the ovary) are very rare, unless the rest of the flower is epigynous.

144. An *epigynous disk* is a name given either to the thickened summit of the ovary in epigynous flowers, or very rarely to a real disk or enlargement of the receptacle closing over the ovary.

145. In the relative position of any two or more parts of the flower, whether in the same or in different whorls, they are

connivent, when nearer together at the summit than at the base.

divergent, when further apart at the summit than at the base.

coherent, when united together, but so slightly that they can be separated with little or no laceration; and one of the two coherent parts (usually the smallest or least important) is said to be *adherent* to the other. Grammatically speaking, these two terms convey nearly the same meaning, but require a different form of phrase; practically however it has been found more convenient to restrict *cohesion* to the union of parts of the same whorl, and *adhesion* to the union of parts of different whorls.

connate, when so closely united that they cannot be separated without laceration. Each of the two connate parts, and especially that one which is considered the smaller or of the least importance, is said to be *adnate* to the other.

free, when neither coherent nor connate.

distinct is also used in the same sense, but is also applied to parts distinctly visible or distinctly limited.

§ 13. *The Fruit.*

146. The **Fruit** (15) consists of the ovary and whatever other parts of the flower are *persistent* (*i.e.*, persist at the time the seed is ripe), usually enlarged, and more or less altered in shape and consistence. It encloses or covers the seed or seeds till the period of maturity, when it either opens for the seed to escape, or falls to the ground with the seed. When stalked, its stalk has been termed a *carpophore.*

147. Fruits are, in elementary works, said to be *simple* when the result of a single flower, *compound* when they proceed from several flowers closely packed or combined in a head. But as a fruit resulting from a single flower, with several distinct carpels, is compound in the sense in which that term is applied to the ovary, the terms *single* and *aggregate*, proposed for the fruit resulting from one or several flowers, may be more appropriately adopted. In descriptive botany a fruit is always supposed to result from a single flower unless the contrary be stated. It may, like the pistil, be syncarpous or apocarpous (125) ; and as in many cases carpels united in the flower may become separate as they ripen, an apocarpous fruit may result from a syncarpous pistil.

148. The involucre or bracts often persist and form part of aggregate fruits, but very seldom so in single ones.

149. The receptacle becomes occasionally enlarged and succulent; if when ripe it falls off with the fruit, it is considered as forming part of it.

150. The adherent part of the calyx of epigynous flowers always persists and forms part of the fruit; the free part of the calyx of epigynous flowers or the calyx of perigynous flowers, either persists entirely at the top of or round the fruit, or the lobes alone fall off, or the lobes fall off with whatever part of the calyx is above the insertion of the petals, or the whole of what is free from the ovary falls off, including the disk bearing the petals. The calyx of hypogynous flowers usually falls off entirely or persists entirely. In general a calyx is called deciduous if any part falls off. When it persists it is either enlarged round or under the fruit, or it withers and dries up.

151. The corolla usually falls off entirely ; when it persists it is usually withered and dry (*marcescent*), or very seldom enlarges round the fruit.

152. The stamens either fall off, or more or less of their filaments persists, usually withered and dry.

153. The style sometimes falls off or dries up and disappears ; sometimes persists, forming a point to the fruit, or becomes enlarged into a wing or other appendage to the fruit.

154. The *Pericarp* is the portion of the fruit formed of the ovary, and whatever adheres to it exclusive of and outside of the seed or seeds, exclusive also of the persistent receptacle, or of whatever portion of the calyx persists round the ovary without adhering to it.

155. Fruits have often external appendages called *wings* (alæ), *beaks*, *crests*, *awns*, etc., according to their appearance. They are either formed by persistent parts of the flower more or less altered, or grow out of the ovary or the persistent part of the calyx. If the appendage be a ring of hairs or scales round the top of the fruit, it is called a *pappus.*

156. Fruits are generally divided into *succulent* (including *fleshy*, *pulpy*, and *juicy* fruits) and *dry*. They are *dehiscent* when they open at maturity to let out the seeds, *indehiscent* when they do not open spontaneously but fall off with the seeds. Succulent fruits are usually indehiscent.

157. The principal kinds of succulent fruits are

the *Berry*, in which the whole substance of the pericarp is fleshy or pulpy, with the exception of the outer skin or rind, called the *Epicarp*. The seeds themselves are usually immersed in the pulp; but in some berries, the seeds are separated from the pulp by the walls of the cavity or cells of the ovary, which form as it were a thin inner skin or rind, called the *Endocarp*.

the *Drupe*, in which the pericarp, when ripe, consists of two distinct portions, an outer succulent one called the *Sarcocarp*, or *Mesocarp* (covered like the berry by a skin or epicarp), and an inner dry endocarp called the *Putamen*, which is either *cartilaginous* (of the consistence of parchment) or hard and woody. In the latter case it is commonly a *stone*, and the drupe a *stone-fruit*. When the putamen consists of several distinct stones or nuts, each enclosing a seed, they are called *pyrenes*, or sometimes *kernels*.

158. The principal kinds of dry fruits are

the *Capsule* or *Pod*,* which is dehiscent. When ripe the pericarp usually splits longitudinally into as many or twice as many pieces, called *valves*, as it contains cells or placentas. If these valves separate at the line of junction of the carpels, that is, along the line of the placentas or dissepiments, either splitting them or leaving them attached to the axis, the dehiscence is termed *septicidal*; if the valves separate between the placentas or dissepiment, the dehiscence is *loculicidal*, and the valves either bear the placentas or dissepiments along their middle line, or leave them attached to the axis. Sometimes also the capsule discharges its seeds by *slits*, *chinks*, or *pores*, more or less regularly arranged, or bursts irregularly, or separates into two parts by a horizontal line; in the latter case it is said to be *circumsciss*.

the *Nut* or *Achene*, which is indehiscent and contains but a single seed. When the pericarp is thin in proportion to the seed it encloses, the whole fruit (or each of its lobes) has the appearance of a single seed, and is so called in popular language. If the pericarp is thin and rather loose, it is often called a *Utricle*. A *Samara* is a nut with a wing at its upper end.

159. Where the carpels of the ovary are distinct (125) they may severally become as many distinct berries, drupes, capsules, or achenes. Separate carpels are usually more or less compressed laterally, with more or less prominent inner and outer edges, called *sutures*, and, if dehiscent, the carpel usually opens at these sutures. A *Follicle* is a carpel opening at the inner suture only. In some cases where the carpels are united in the ovary they will separate when ripe; they are then called *Cocci* if one-seeded.

160. The peculiar fruits of some of the large Orders have received special names, which will be explained under each Order. Such are the *siliqua* and *silicule* of Cruciferæ, the *legume* of Leguminosæ, the *pome* of *Pyrus* and its allies, the *pepo* of Cucurbitaceæ, the *cone* of Coniferæ, the *grain* or *caryopsis* of Gramineæ, etc.

§ 14. *The Seed.*

161. The **Seed** is enclosed in the pericarp in the great majority of flowering plants, called therefore *Angiosperms*, or *angiospermous plants*. In *Coniferæ* and a very few allied genera, called *Gymnosperms*, or *gymnospermous plants*, the seed is naked, without any real pericarp. These truly gymnospermous plants must not be confounded with *Labiatæ*, *Boragineæ*, etc., which have also been falsely called gymnospermous, their small nuts having the appearance of seeds (158).

162. The seed when ripe contains an *embryo* or young plant, either filling or nearly filling the cavity, but not attached to the outer skin or the seed, or more or less immersed in a mealy, oily, fleshy, or horn-like substance, called the *albumen*, or *perisperm*. The presence or absence of this albumen, that is, the distinction between *albuminous* and *exalbuminous* seeds, is one of great importance. The embryo or albumen can often only be found or distinguished when the seed is quite ripe, or sometimes only when it begins to germinate.

163. The shell of the seed consists usually of two separable *coats*. The outer coat, called the *testa*, is usually the principal one, and in most cases the only one attended to in descriptions. It may be hard and *crustaceous*, woody or bony, or thin and *membranous* (skin-like), dry, or rarely succulent. It is sometimes expanded into *wings*, or bears a tuft of hair, cotton, or wool, called a *coma*. The inner coat is called the *tegmen*.

164. The *funicle* is the stalk by which the seed is attached to the placenta. It is occasionally enlarged into a membranous, pulpy or fleshy appendage, sometimes spreading over a considerable part of the seed, or nearly enclosing it, called an *aril*.

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* In English descriptions, *pod* is more frequently used when it is long and narrow; *capsule*, or sometimes *pouch*, when it is short and thick or broad.

A *strophiole* or *caruncle* is a similar appendage proceeding from the testa by the side of or near the funicle.

165. The *hilum* is the scar left on the seed where it separates from the funicle. The *micropyle* is a mark indicating the position of the foramen of the ovule (133).

166. The **Embryo** (162) consists of the *Radicle* or base of the future root, one or two *Cotyledons* or future seed-leaves, and the *Plumule* or future bud within the base of the cotyledons. In some seeds, especially where there is no albumen, these several parts are very conspicuous, in others they are very difficult to distinguish until the seed begins to germinate. Their observation, however, is of the greatest importance, for it is chiefly upon the distinction between the embryo with one or with two cotyledons that are founded the two great classes of phænogamous plants, *Monocotyledons* and *Dicotyledons*. Cotyledons are said to be *conduplicate* when folded once lengthwise; *contortuplicate* when variously folded or twisted; *conferruminate* when so united that no line of separation can be traced.

167. Although the embryo lies loose (unattached) within the seed, it is generally in some determinate position with respect to the seed or to the whole fruit. This position is described by stating the direction of the radicle next to or more or less remote from the *hilum*, or it is said to be *superior* if pointing towards the summit of the *fruit*, *inferior* if pointing towards the base of the *fruit*.

§ 15. *Accessory Organs.*

168. Under this name are included, in many elementary works, various external parts of plants which do not appear to act any essential part either in the vegetation or reproduction of the plant. They may be classed under four heads: *Tendrils* and *Hooks*, *Thorns* and *Prickles*, *Hairs* and *Glands*.

169. **Tendrils** (*cirrhi*) are usually abortive petioles, or abortive peduncles, or sometimes abortive ends of branches. They are simple or more or less branched, flexible, and coil more or less firmly round any objects within their reach, in order to support the plant to which they belong. *Hooks* are similar holdfasts, but of a firmer consistence, not branched, and less coiled.

170. **Thorns** and **Prickles** have been fancifully called the weapons of plants. A *Thorn* or *Spine* is the strongly pointed extremity of a branch, or abortive petiole, or abortive peduncle. A *Prickle* is a sharply pointed excrescence from the epidermis, and is usually produced on a branch, on the petiole or veins of a leaf, or on a peduncle, or even on the calyx or corolla. When the teeth of a leaf or the stipules are pungent, they are also called *prickles*, not *thorns*. A plant is *spinous* if it has thorns, *aculeate* if it has prickles.

171. **Hairs,** in the general sense, or the *indumentum* (or clothing) of a plant include all those productions of the epidermis which have, by a more or less appropriate comparison, been termed *bristles, hairs, down, cotton*, or *wool*.

172. Hairs are often branched. They are said to be *attached by the centre*, if parted from the base, and the forks spread along the surface in opposite directions; *plumose*, if the branches are arranged along a common axis, as in a feather; *stellate*, if several branches radiate horizontally. These stellate hairs have sometimes their rays connected together at the base, forming little flat circular disks attached by the centre, and are then called *scales*, and the surface is said to be *scaly* or *lepidote*.

173. The *Epidermis*, or outer skin, of an organ, as to its surface and indumentum, is

smooth, when without any protuberance whatever.

glabrous, when without hairs of any kind.

glabrescent, glabrate, becoming glabrous.

striate, when marked with parallel longitudinal lines, either slightly raised or merely discoloured.

furrowed (*sulcate*) or *ribbed* (*costate*) when the parallel lines are more distinctly raised.

rugose, when wrinkled or marked with irregular raised or depressed lines.

umbilicate, when marked with a small round depression.

umbonate, when bearing a small boss like that of a shield.

viscous, viscid, or *glutinous*, when covered with a sticky or clammy exudation.

scabrous, when rough to the touch.

tuberculate or *warted*, when covered with small, obtuse, wart-like protuberances.

muricate, when the protuberances are more raised and pointed but yet short and hard.

echinate, when the protuberances are longer and sharper, almost prickly.

setose or *bristly*, when bearing very stiff erect straight hairs.

glandular-setose, when the setæ or bristles terminate in a minute resinous head or drop. In some works, especially in the case of Roses and *Rubus*, the meaning of *setæ* has been restricted to such as are glandular.

glochidiate, when the setæ are hooked at the top.

pilose, when the surface is thinly sprinkled with rather long simple hairs.

hispid, when more thickly covered with rather stiff hairs.

hirsute, when the hairs are dense and not so stiff.

downy or *pubescent*, when the hairs are short and soft; *puberulent*, when slightly pubescent.

strigose, when the hairs are rather short and stiff, and lie close along the surface all in the same direction; *strigillose*, when slightly strigose.

tomentose or *cottony*, when the hairs are very short and soft, rather dense and more or less intricate, and usually white or whitish.

woolly (*lanate*), when the hairs are long and loosely intricate, like wool. The wool or tomentum is said to be *floccose* when closely intricate and readily detached, like fleece.

mealy (*farinose*), when the hairs are excessively short, intricate and white, and come off readily, having the appearance of meal or dust.

canescent or *hoary*, when the hairs are so short as not readily to be distinguished by the naked eye, and yet give a general whitish hue to the epidermis.

glaucous, when of a pale bluish-green, often covered with a fine bloom.

glaucescent, subglaucous or becoming glaucous.

174. The meanings here attached to the above terms are such as appear to have been most generally adopted, but there is much vagueness in the use practically made of many of them by different botanists. This is especially the case with the terms *pilose*, *hispid*, *hirsute*, *pubescent*, and *tomentose*.

175. The name of **Glands** is given to several different productions, and principally to the four following:—

1. Small wart-like or shield-like bodies, either sessile or sometimes stalked, of a fungous or somewhat fleshy consistence, occasionally secreting a small quantity of oily or resinous matter, but more frequently dry. They are generally few in number, often definite in their position and form, and occur chiefly on the petiole or principal veins of leaves, on the branches of inflorescences, or on the stalks or principal veins of bracts, sepals, or petals.

2. Minute raised dots, usually black, red, or dark-coloured, of a resinous or oily nature, always superficial, and apparently exudations from the epidermis. They are often numerous on leaves, bracts, sepals, and green branches, and occur even on petals and stamens, more rarely on pistils. When raised upon slender stalks they are called *pedicellate* (or *stipitate*) *glands*, or *glandular hairs*, according to the thickness of the stalk.

3. Small, globular, oblong or even linear vesicles, filled with oil, imbedded in the substance itself of leaves, bracts, floral organs, or fruits. They are often very numerous, like transparent dots, sometimes few and determinate in form and position. In the pericarp of *Umbelliferæ* they are remarkably regular and conspicuous, and take the name of *vittæ*.

4. *Lobes* of the disk (137), or other small fleshy excrescences within the flower, whether from the receptacle, calyx, corolla, stamens, or pistil.

CHAP. II. CLASSIFICATION, OR SYSTEMATIC BOTANY.

176. It has already been observed (3) that descriptions of plants should, as nearly as possible, be arranged under natural divisions, so as to facilitate the comparison of each plant with those most nearly allied to it. The descriptions of plants here

alluded to are descriptions of *species;* the natural divisions of the Flora refer to natural *groups of species.*

177. A **Species** comprises all the individual plants which resemble each other sufficiently to make us conclude that they are all, or *may have been* all, descended from a common parent. These individuals may often differ from each other in many striking particulars, such as the colour of the flower, size of the leaf, etc., but these particulars are such as experience teaches us are liable to vary in the seedlings raised from one individual.

178. When a large number of the individuals of a species differ from the others in any striking particular they constitute a **Variety.** If the variety generally comes true from seed, it is often called a *Race.*

179. A *Variety* can only be propagated with certainty by grafts, cuttings, bulbs, tubers, or any other method which produces a new plant by the development of one or more buds taken from the old one. A *Race* may with care be propagated by seed, although seedlings will always be liable, under certain circumstances, to lose those particulars which distinguish it from the rest of the species. A real *Species* will always come true from seed.

180. The known species of plants (now near 100,000) are far too numerous for the human mind to study without classification, or even to give distinct single names to. To facilitate these objects, an admirable system, invented by Linnæus, has been universally adopted, viz., one common substantive name is given to a number of species which resemble each other more than they do any other species; the species so collected under one name are collectively called a **Genus,** the common name being the *generic* name. Each species is then distinguished from the others of the same genus by the addition of an adjective epithet or *specific name.* Every species has thus a botanical name of two words. In Latin, the language usually used for the purpose, the first word is a substantive and designates the genus; the second, an adjective, indicates the species.

181. The genera thus formed being still too numerous (above 6000) for study without further arrangement, they have been classed under the same principles, viz., genera which resemble each other more than they do any other genera, have been collected together into groups of a higher degree called **Families** or **Natural Orders,** to each of which a common name has been given. This name is in Latin an adjective plural, usually taken from the name of some one *typical* genus, generally the best known, the first discovered, or the most marked (e.g., *Ranunculaceæ* from *Ranunculus*). This is however for the purpose of study and comparison. To speak of a species, to refer to it and identify it, all that is necessary is to give the generic and specific names.

182. Natural Orders themselves (of which we reckon near 200) are often in the same manner collected into **Classes;** and where Orders contain a large number of genera, or genera a large number of species, they require further classification. The genera of an Order are then collected into minor groups called *Tribes,* the species of a genus into *Sections,* and in a few cases this intermediate classification is carried still further. The names of these several groups the most generally adopted are as follows, beginning with the most comprehensive or highest :—

Classes.
Subclasses or *Alliances.*
Natural Orders or Families.
Suborders.
Tribes.
Subtribes.
Divisions.
Subdivisions.
Genera.
Subgenera.
Sections.
Subsections.
Species.
Varieties.

183. The characters (3) by which a species is distinguished from all other species of the same genus are collectively called the *specific character* of the plant; those by which its genus is distinguished from other genera of the Order, or its Order from other Orders, are respectively called the *generic* or *ordinal* character, as the case may be. The *habit* of a plant, of a species, a genus, etc., consists of such general characters as strike the eye at first sight, such as size, colour, ramification, arrangement of the leaves, inflorescence, etc., and are chiefly derived from the organs of vegetation.

184. Classes, Orders, Genera, and their several subdivisions, are called *natural* when, in forming them, all resemblances and differences are taken into account, valuing them according to their evident or presumed importance; *artificial*, when resemblances and differences in some one or very few particulars only are taken into account independently of all others.

185. The number of species included in a genus, or the number of genera in an Order, is very variable. Sometimes two or three or even a single species may be so different from all others as to constitute the entire genus: in others, several hundred species may resemble each other so much as to be all included in one genus; and there is the same discrepancy in the number of genera to a Family. There is moreover, unfortunately, in a number of instances, great difference of opinion as to whether certain plants differing from each other in certain particulars are varieties of one species or belong to distinct species; and again, whether two or more groups of species should constitute as many sections of one genus, or distinct genera, or tribes of one Order, or even distinct Natural Orders. In the former case, as a species is supposed to have a real existence in nature, the question is susceptible of argument, and sometimes of absolute proof. But the place a group should occupy in the scale of degree is very arbitrary, being often a mere question of convenience. The more subdivisions upon correct principles are multiplied, the more they facilitate the study of plants, provided always the main resting-points for constant use, the Order and the Genus, are comprehensive and distinct. But if every group into which a genus can be divided be erected into a distinct genus, with a substantive name to be remembered whenever a species is spoken of, all the advantages derived from the beautiful simplicity of the Linnæan nomenclature are gone.

CHAP. III. VEGETABLE ANATOMY AND PHYSIOLOGY.

§ 1. *Structure and Growth of the Elementary Tissues.*

186. If a very thin slice of any part of a plant be placed under a microscope of high magnifying power, it will be found to be made up of variously shaped and arranged ultimate parts, forming a sort of honeycombed structure. These ultimate parts are called *cells*, and form by their combination the *elementary tissues* of which the entire plant is composed.

187. A cell in its simplest state is a closed membranous sac, formed of a substance permeable by fluids, though usually destitute of visible pores. Each cell is a distinct individual, separately formed and separately acting, though cohering with the cells with which it is in contact, and partaking of the common life and action of the tissue of which it forms a part. The membranes separating or enclosing the cells are also called their *walls*.

188. Botanists usually distinguish the following tissues:—

(1) *Cellular tissue*, or *parenchyma*, consists usually of thin-walled cells, more or less round in form, or with their length not much exceeding their breadth, and not tapering at the ends. All the soft parts of the leaves, the pith of stems, the pulp of fruits, and all young growing parts, are formed of it. It is the first tissue produced, and continues to be formed while growth continues, and when it ceases to be active the plant dies.

(2) *Woody tissue*, or *prosenchyma*, differs in having its cells considerably longer than broad, usually tapering at each end into points and overlapping each other. The cells are commonly thick-walled; the tissue is firm, tenacious, and elastic, and constitutes the principal part of wood, of the inner bark, and of the nerves and veins of leaves, forming, in short, the framework of the plant.

(3) *Vascular tissue*, or the *vessels* or *ducts* of plants, so called from the mistaken notion that their functions are analogous to those of the vessels (veins and arteries) of animals. A *vessel* in plants consists of a vertical row of cells, which have their transverse partition-walls obliterated, so as to form a continuous tube. All phænogamous plants, as well as ferns and a few other cryptogamous plants, have vessels, and are therefore called *vascular plants;* so the majority of cryptogams having only cel-

lular tissue are termed *cellular plants.* Vessels have their sides very variously marked; some, called *spiral vessels,* have a spiral fibre coiled up their inside, which unrolls when the vessel is broken; others are marked with longitudinal slits, cross bars, minute dots or pits, or with transverse rings. The size of vessels is also very variable in different plants; in some they are of considerable size and visible to the naked eye in cross sections of the stem, in others they are almost absent or can only be traced under a strong magnifier.

189. Various modifications of the above tissues are distinguished by vegetable anatomists under names which need not be enumerated here as not being in general practical use. *Air-vessels, cysts, turpentine-vessels, oil-reservoirs,* etc., are either cavities left between the cells, or large cells filled with peculiar secretions.

190. When tissues are once formed, they increase, not by the general enlargement of the whole of the cells already formed, but by *cell-division,* that is, by the division of young and vitally active cells, and the enlargement of their portions. In the formation of the embryo, the first cell of the new plant is formed not by division, but around a segregate portion of the contents of a previously existing cell, the embryo-sac. This is termed *free cell-formation,* in contradistinction to cell-division.

191. A young and vitally active cell consists of the *outer wall,* formed of a more or less transparent substance called *cellulose,* permeable by fluids, and of ternary chemical composition (carbon, hydrogen, and oxygen); and of the *cell-contents,* usually viscid or mucilaginous, consisting of *protoplasm,* a substance of quaternary chemical composition (carbon, hydrogen, oxygen, and nitrogen), which fills an important part in cell-division and growth. Within the cell (either in the centre or excentrical) is usually a minute, soft, subgelatinous body called the *nucleus,* whose functions appear to be intimately connected with the first formation of the new cell. As this cell increases in size and its walls in thickness, the protoplasm and watery cell-sap become absorbed or dried up, the firm cellulose wall alone remaining as a permanent fabric, either empty or filled with various organized substances produced or secreted within it.

192. The principal organized contents of cells are

sap, the first product of the digestion of the food of plants; it contains the elements of vegetable growth in a dissolved condition.

sugar, of which there are two kinds, called *cane-sugar* and *grape-sugar.* It usually exists dissolved in the sap. It is found abundantly in growing parts, in fruits, and in germinating seeds.

dextrine, or vegetable mucilage, a gummy substance, between mucilage and starch.

starch or *fecula,* one of the most universal aud conspicuous of cell-contents, and often so abundant in farinaceous roots and seeds as to fill the cell-cavity. It consists of minute grains call *starch-granules,* which vary in size and are marked with more or less conspicuous concentric lines. The chemical constitution of starch is the same as that of cellulose; it is unaffected by cold water, but forms a jelly with boiling water, and turns blue when tested by iodine.

chlorophyll, very minute granules, containing nitrogen, and coloured green under the action of sunlight. These granules are most abundant in the layers of cells immediately below the surface or epidermis of leaves and young bark. The green colouring matter is soluble in alcohol, and may thus be removed from the granules.

chromule, a name given to a similar colouring-matter when green.

wax, oils, camphor, and *resinous* matter, are common in cells or in cavities in the tissues between the cells, also various mineral substances, either in an amorphous state or as microscopic crystals, when they are called *Raphides.*

§ 2. *Arrangement of the Elementary Tissues, or Structure of the Organs of Plants.*

193. Leaves, young stems, and branches, and most parts of phænogamous plants, during the first year of their existence consist anatomically of

1, a *cellular system,* or continuous mass of cellular tissue, which is developed both vertically as the stem or other parts increase in length, and horizontally or laterally as they increase in thickness or breadth. It surrounds or is intermixed with the fibro-vascular system, or it may exist alone in some parts of phænogamous plants, as well as in cryptogamous ones.

2, a *fibro-vascular system*, or continuous mass of woody and vascular tissue, which is gradually introduced vertically into, and serves to bind together, the cellular system. It is continued from the stem into the petioles and veins of the leaves, and into the pedicels and parts of the flowers, and is never wholly wanting in any phænogamous plant.

3, an *epidermis*, or outer skin, formed of one or more layers of flattened (horizontal), firmly coherent, and usually empty cells, with either thin and transparent or thick and opaque walls. It covers almost all parts of plants exposed to the outward air, protecting their tissues from its immediate action, but is wanting in those parts of aquatic plants which are constantly submerged.

194. The epidermis is frequently pierced by minute spaces between the cells, called *Stomates*. They are oval or mouth-shaped, bordered by *lips*, formed of two or more elastic cells so disposed as to cause the stomate to open in a moist, and to close up in a dry state of the atmosphere. They communicate with intercellular cavities, and are obviously designed to regulate evaporation and respiration. They are chiefly found upon leaves, especially on the under surface.

195. When a phænogamous plant has outlived the first season of its growth, the anatomical structure of its stem or other perennial parts becomes more complicated and very different in the two great classes of phænogamous plants called *Exogens* and *Endogens*, which correspond with very few exceptions to the two classes Dicotyledons and Monocotyledons (167), founded on the structure of the embryo. In Exogens (Dicotyledons) the woody system is placed in concentric layers between a central *pith* (198, 1), and an external separable *bark* (198, 5). In Endogens (Monocotyledons) the woody system is in separate small bundles or fibres running through the cellular system without apparent order, and there is usually no distinct central pith, nor outer separable bark.

196. The anatomical structure is also somewhat different in the different organs of plants. In the **Root,** although it is constructed generally on the same plan as the stem, yet the regular organization, and the difference between Exogens and Endogens, is often disguised or obliterated by irregularities of growth, or by the production of large quantities of cellular tissue filled with starch or other substances (192). There is seldom, if ever, any distinct pith, the concentric circles of fibro-vascular tissue in Exogens are often very indistinct or have no relation to seasons of growth, and the epidermis has no stomates.

197. In the **Stem** or branches, during the first year or season of their growth, the difference between Exogens and Endogens is not always very conspicuous. In both there is a tendency to a circular arrangement of the fibro-vascular system, leaving the centre either vacant or filled with cellular tissue (pith) only, and a more or less distinct outer rind is observable even in several Endogens. More frequently, however, the distinction is already very apparent the first season, especially towards its close. The fibro-vascular bundles in Endogens usually anastomose but little, passing continuously into the branches and leaves. In Exogens the circle of fibro-vascular bundles forms a more continuous cylinder of network emitting lateral offsets into the branches and leaves.

198. The Exogenous stem, after the first year of its growth, consists of

1, the *pith*, a cylinder of cellular tissue, occupying the centre or longitudinal axis of the stem. It is active only in young stems or branches, becomes dried up and compressed as the wood hardens, and often finally disappears, or is scarcely distinguishable in old trees.

2, the *medullary sheath*, which surrounds and encases the pith. It abounds in spiral vessels (188, 3) and is in direct connexion when young, with the leaf-buds and branches, with the petioles and veins of leaves, and other ramifications of the system. Like the pith, it gradually disappears in old wood.

3, the *wood*, which lies immediately outside the medullary sheath. It is formed of woody tissue (188, 2), through which, in most cases, vessels (188, 3) variously disposed are interspersed. It is arranged in annual concentric circles

(211), which usually remain active during several years, but in older stems the central and older layers become hard, dense, comparatively inactive, and usually deeper coloured, forming what is called *heart-wood* or *duramen*, the outer, younger, and usually paler-coloured living layers constituting the *sapwood* or *alburnum*.

4, the *medullary rays*, which form vertical plates, originating in the pith, and, radiating from thence, traverse the wood and terminate in the bark. They are formed of cellular tissue, keeping up a communication between the living portion of the centre of the stem and its outer surface. As the heart-wood is formed, the inner portion of the medullary rays ceases to be active, but they usually may still be seen in old wood, forming what carpenters call the *silver grain*.

5, the *bark*, which lies outside the wood, within the epidermis. It is, like the wood, arranged in annual concentric circles (211), of which the outer older ones become dry and hard, forming the *corky layer* or *outer bark*, which, as it is distended by the thickening of the stem, either cracks or is cast off with the epidermis, which is no longer distinguishable. Within the corky layer is the *cellular*, or *green*, or *middle bark*, formed of loose thin-walled pulpy cells containing chlorophyll (192); and which is usually the layer of the preceding season. The innermost and youngest circle, next the young wood, is the *liber* or *inner bark*, formed of long tough woody tissue called *bast-cells*.

199. The endogenous stem, as it grows old, is not marked by the concentric circles of Exogens. The wood consists of a *matrix* of cellular tissue irregularly traversed by vertical cords or bundles of woody and vascular tissue, which are in connexion with the leaves. These vascular bundles change in structure and direction as they pass down the stem, losing their vessels, they retain only their bast- or long wood-cells, usually curving outwards towards the rind. The old wood becomes more compact and harder towards the circumference than in the centre. The epidermis or rind either hardens so as to prevent any increase of diameter in the stem or it distends, without increasing in thickness or splitting or casting off any outer layers.

200. In the **Leaf**, the structure of the petioles and principal ribs or veins is the same as that of the young branches of which they are ramifications. In the expanded portion of the leaf the fibro-vascular system becomes usually very much ramified, forming the smaller veins. These are surrounded and the interstices filled up by a copious and very active cellular tissue. The majority of leaves are horizontal, having a differently constructed upper and under surface. The cellular stratum forming the upper surface consists of closely set cells, placed vertically, with their smallest ends next the surface, and with few or no stomates in the epidermis. In the stratum forming the under surface, the cells are more or less horizontal, more loosely placed, and have generally empty spaces between them, with stomates in the epidermis communicating with these intercellular spaces. In vertical leaves (as in a large number of Australian plants) the two surfaces are nearly similar in structure.

201. When leaves are reduced to scales, acting only as protectors of young buds, or without taking any apparent part in the economy of vegetable life, their structure, though still on the same plan, is more simple; their fibro-vascular system is less ramified, their cellular system more uniform, and there are few or no stomates.

202. Bracts and floral envelopes, when green and much developed, resemble leaves in their anatomical structure, but in proportion as they are reduced to scales or transformed into petals, they lose their stomates, and their systems, both fibro-vascular and cellular, become more simple and uniform, or more slender and delicate.

203. In the stamens and pistils the structure is still nearly the same. The fibro-vascular system, surrounded by and intermixed with the cellular tissue, is usually simple in the filaments and style, more or less ramified in the flattened or expanded parts, such as the anther-cases, the walls of the ovary, or capillary leaves, etc. The pollen consists of granular cells variously shaped, marked, or combined, peculiar forms being constant in the same species, or often in large genera, or even Orders. The stigmatic portion of the pistil is a mass of loosely cellular substance, destitute of epidermis, and usually is in communication with the ovary by the channel running down the centre of the style.

204. Tubers, fleshy thickenings of the stem or other parts of the plant, succulent

leaves or branches, the fleshy, woody, or bony parts of fruits, the albumen, and the thick fleshy parts of embryos, consist chiefly of largely developed cellular tissue, replete with starch or other substances (192), deposited apparently in most cases for the eventual future use of the plant or its parts when recalled into activity at the approach of a new season.

205. Hairs (171) are usually expansions or processes of the epidermis, and consist of one or more cells placed end to end. When thick or hardened into prickles, they still consist usually of cellular tissue only. Thorns (170) contain more or less of a fibro-vascular system, according to their degree of development.

206. Glands, in the primary sense of the word (175, 1), consist usually of a rather loose cellular tissue without epidermis, and often replete with resinous or other substances.

§ 3. *Growth of the Organs.*

207. Roots grow in length constantly and regularly at the extremities only of their fibres, in proportion as they find the requisite nutriment. They form no buds containing the germ of future branches, but their fibres proceed irregularly from any part of their surface without previous indication, and when their growth has been stopped for a time, either wholly by the close of the season, or partially by a deficiency of nutriment at any particular spot, it will, on the return of favourable circumstances, be resumed at the same point, if the growing extremities be uninjured. If during the dead season, or at any other time, the growing extremity is cut off, dried up, or otherwise injured, or stopped by a rock or other obstacle opposing its progress, lateral fibres will be formed on the still living portion; thus enabling the root as a whole to diverge in any direction, and travel far and wide when lured on by appropriate nutriment.

208. This growth is not however by the successive formation of terminal cells attaining at once their full size. The cells first formed on a fibre commencing or renewing its growth, will often dry up and form a kind of terminal cap, which is pushed on as cells are formed immediately under it; and the new cells, constituting a greater or lesser portion of the ends of the fibres, remain some time in a growing state before they have attained their full size.

209. The roots of Exogens, when perennial, increase in thickness like stems by the addition of concentric layers, but these are usually much less distinctly marked; and in a large number of perennial Exogens and most Endogens the roots are annual, perishing at the close of the season, fresh adventitious roots springing from the stock when vegetation commences the following season.

210. The stem, including its branches and appendages (leaves, floral organs, etc.), grows in length by additions to its extremity, but a much greater proportion of the extremity and branches remains in a growing and expanding state for a much longer time than in the case of the root. At the close of one season, leaf-buds or seeds are formed, each containing the germ of a branch or young plant to be produced the following season. At a very early stage of the development of these buds or seeds, a commencement may be found of many of the leaves it is to bear; and before a leaf unfolds, every leaflet of which it is to consist, every lobe or tooth which is to mark its margin, may often be traced in miniature, and thenceforth till it attains its full size, the branch grows and expands in every part. In some cases however the lower part of a branch and more rarely (*e.g.*, in some *Meliaceæ*) the lower part of a compound leaf attains its full size before the young leaves or leaflets of the extremity are yet formed.

211. The perennial stem, if exogenous (198), grows in thickness by the addition every season of a new layer or ring of wood between the outermost preceding layer and the inner surface of the bark, and by the formation of a new layer or ring of bark within the innermost preceding layer and outside the new ring of wood, thus forming a succession of concentric circles. The sap elaborated by the leaves finds its way, in a manner not as yet absolutely ascertained, into the *cambium-region*, a zone of tender thin-walled cells connecting the wood with the bark, by the division and enlargement of which new cells (190) are formed. These cells separate in layers, the inner ones constituting the new ring of wood, and the outer ones the new

bark or liber. In most exogenous trees, in temperate climates, the seasons of growth correspond with the years, and the rings of wood remain sufficiently distinct to indicate the age of the tree; but in many tropical and some evergreen trees, two or more rings of wood are formed in one year.

212. In endogenous perennial stems (199), the new wood or woody fibre is formed towards the centre of the stem, or irregularly mingled with the old. The stem consequently either only becomes more dense without increasing in thickness, or only increases by gradual distension, which is never very considerable. It affords therefore no certain criterion for judging of the age of the tree.

213. Flowers have generally all their parts formed, or indicated by protuberances or growing cells at a very early stage of the bud. These parts are then usually more regularly placed than in the fully developed flower. Parts which afterwards unite are then distinct, many are present in this rudimentary state which are never further developed, and parts which are afterwards very unequal or dissimilar are perfectly alike at this early period. On this account flowers in this very early stage are supposed by some modern botanists to be more *normal,* that is, more in conformity to a supposed type; and the study of the early formation and growth of the floral organs, called *Organogenesis,* has been considered essential for the correct appreciation of the affinities of plants. In some cases, however, it would appear that modifications of development, not to be detected in the very young bud, are yet of great importance in the distinction of large groups of plants, and that Organogenesis, although it may often assist in clearing up a doubtful point of affinity, cannot nevertheless be exclusively relied on in estimating the real value of peculiarities of structure.

214. The flower is considered as a *bud* (*flower-bud, alabastrum*) until the perianth expands, the *period of flowering* (*anthesis*) is that which elapses from the first expanding of the perianth, till the pistil is set or begins to enlarge, or, when it does not set, until the stamens and pistil wither or fall. After that, the enlarged ovary takes the name of *young fruit.*

215. At the close of the season of growth, at the same time as the leaf-buds or seeds are formed containing the germ of future branches or plants, many plants form also, at or near the bud or seed, large deposits, chiefly of starch. In many cases,—such as the tubers of a potato or other root-stock, the scales or thickened base of a bulb, the albumen or the thick cotyledons of a seed—this deposit appears to be a store of nutriment, which is partially absorbed by the young branch or plant during its first stage of growth, before the roots are sufficiently developed to supply it from without. In some cases, however, such as the fleshy thickening of some stems or peduncles, the pericarps of fruits which perish long before *germination* (the first growth of the seed), neither the use nor the cause of these deposits has as yet been clearly explained.

§ 4. *Functions of the Organs.*

216. The functions of the Root are,—1. To fix the plant in or to the soil, or other substance on which it grows. 2. To absorb nourishment from the soil, water, or air, into which the fibres have penetrated (or from other plants in the case of parasites), and to transmit it rapidly to the stem. The absorption takes place through the young growing extremities of the fibres, and through a peculiar kind of hairs or absorbing organs which are formed at or near those growing extremities. The transmission to the stem is through the tissues of the root itself. The nutriment absorbed consists chiefly of carbonic acid and nitrogen or nitrogenous compounds dissolved in water. 3. In some cases roots secrete or exude small quantities of matter in a manner and with a purpose not satisfactorily ascertained.

217. The Stem and its branches support the leaves, flowers, and fruit, transmit the crude sap, or nutriment absorbed by the roots and mixed with previously organized matter, to the leaves, and retransmit the assimilated or elaborated sap from the leaves to the growing parts of the plant, to be there used up, or to form deposits for future use (204). The transmission of the ascending crude sap appears to take place chiefly through the elongated cells associated with the vascular tissues, passing from one cell to another by a process but little understood, but known by the name of *endosmose.*

218. Leaves are functionally the most active of the organs of vegetation. In them is chiefly conducted digestion or *Assimilation*, a name given to the process which accomplishes the following results :—1. The chemical decomposition of the oxygenated matter of the sap, the absorption of carbonic acid, and the liberation of pure oxygen at the ordinary temperature of the air. 2. A counter-operation by which oxygen is absorbed from the atmosphere and carbonic acid is exhaled. 3. The transformation of the residue of the crude sap into the organized substances which enter into the composition of the plant. The exhalation of oxygen appears to take place under the influence of solar heat and light, chiefly from the under surface of the leaf, and to be in some measure regulated by the stomates ; the absorption of oxygen goes on always in the dark, and in the daytime also in certain cases. The transformation of the sap is effected within the tissues of the leaf, and continues probably more or less throughout the active parts of the whole plant.

219. The Floral Organs seldom contribute to the growth of the plant on which they are produced; their functions are wholly concentrated on the formation of the seed with the germ of a future plant.

220. The Perianth (calyx and corolla) acts in the first instance in protecting the stamens and pistils during the early stages of their development. When expanded, the use of the brilliant colours which they often display, of the sweet or strong odours they emit, has not been adequately explained. Perhaps they may have great influence in attracting those insects whose concurrence has been shown in many cases to be necessary for the due transmission of the pollen from the anther to the stigma.

221. The pistil, when stimulated by the action of the pollen, forms and nourishes the young seed. The varied and complicated contrivances by which the pollen is conveyed to the stigma, whether by elastic action of the organs themselves, or with the assistance of wind, of insects, or other extraneous agents, have been the subject of numerous observations and experiments of the most distinguished naturalists, and are yet far from being fully investigated. Their details, however, as far as known, would be far too long for the present outline.

222. The fruit nourishes and protects the seed until its maturity, and then often promotes its dispersion by a great variety of contrivances or apparently collateral circumstances, *e.g.*, by an elastic dehiscence which casts the seed off to a distance ; by the development of a pappus, wings, hooked or other appendages, which allows them to be carried off by winds, or by animals, etc., to which they may adhere ; by their small specific gravity, which enables them to float down streams ; by their attractions to birds, etc., who taking them for food drop them often at great distances, etc. Appendages to the seeds themselves also often promote dispersion.

223. Hairs have various functions. The ordinary indumentum (171) of stems and leaves indeed seems to take little part in the economy of the plant besides perhaps some occasional protection against injurious atmospheric influences, but the root-hairs (216) are active absorbents, the hairs on styles and other parts of flowers appear often materially to assist the transmission of pollen, and the exudations of glandular hairs (175, 2) are often too copious not to exercise some influence on the phenomena of vegetation. The whole question, however, of vegetable exudations and their influence on the economy of vegetable life, is as yet but imperfectly understood.

CHAP. IV. COLLECTION, PRESERVATION, AND DETERMINATION OF PLANTS.

224. Plants can undoubtedly be most easily and satisfactorily examined when freshly gathered. But time will rarely admit of this being done, and it is moreover desirable to compare them with other plants previously observed or collected. *Specimens* must, therefore, be selected for leisurely observation at home, and preserved for future reference. A collection of such specimens constitutes a *Herbarium*.

225. A botanical **Specimen**, to be perfect, should have *root*, *stem*, *leaves*, *flowers* (both open and in bud) and *fruit* (both young and mature). It is not, however, always possible to gather such complete specimens, but the collector should aim at completeness. Fragments, such as leaves without flowers, or flowers without leaves, are of little or no use.

226. If the plant is small (not exceeding 15 in.) or can be reduced to that length by folding, the specimen should consist of the whole plant, including the principal part of the root. If it be too large to preserve the whole, a good flowering branch should be selected, with the foliage as low down as can be gathered with it; and one or two of the lower stem-leaves or radical leaves, if any, should be added, so as to preserve as much as possible of the peculiar aspect of the plant.

227. The specimens should be taken from healthy uninjured plants of a medium size. Or if a specimen be gathered because it looks a little different from the majority of those around it, apparently belonging to the same species, a specimen of the more prevalent form should be taken from the same locality for comparison.

228. For bringing the specimens home, a light portfolio of pasteboard, covered with calico or leather, furnished with straps and buckles for closing, and another for slinging on the shoulder, and containing a few sheets of stout coarse paper, is better than the old-fashioned tin box (except, perhaps, for stiff prickly plants and a few others). The specimens as gathered are placed between the leaves of paper, and may be crowded together if not left long without sorting.

229. If the specimen brought home be not immediately determined when fresh, but dried for future examination, a note should be taken of the time, place, and situation in which it was gathered; of the stature, habit, and other particulars relating to any tree, shrub, or herb of which the specimen is only a portion; of the kind of root it has; of the colour of the flower; or of any other particulars which the specimen itself cannot supply, or which may be lost in the process of drying. These memoranda, whether taken down in the field, or from the living specimen when brought home, should be written on a label attached to the specimen or preserved with it.

230. To dry specimens, they are laid flat between several sheets of bibulous paper, and subjected to pressure. The paper is subsequently changed at intervals, until they are dry.

231. In laying out the specimen, care should be taken to preserve the natural position of the parts as far as consistent with the laying flat. In general, if the specimen is fresh and not very slender, it may be simply laid on the lower sheet, holding it by the stalk and drawing it slightly downwards; then, as the upper sheet is laid over, if it be slightly drawn downwards as it is pressed down, it will be found, after a few trials, that the specimen will have retained a natural form with very little trouble. If the specimen has been gathered long enough to have become flaccid, it will require more care in laying the leaves flat and giving the parts their proper direction. Specimens kept in tin boxes, will also often have taken unnatural bends which will require to be corrected.

232. If the specimen is very bushy, some branches must be thinned out, but always so as to show where they have been. If any part, such as the head of a thistle, the stem of an *Orobanche*, or the bulb of a Lily, be very thick, a portion of what is to be the under side of the specimen may be sliced off. Some thick specimens may be split from top to bottom before drying.

233. If the specimen be succulent or tenacious of life, such as a *Sedum* or an *Orchis*, it may be dipped in boiling water *all but the flowers*. This will kill the plant at once, and enable it to be dried rapidly, losing less of its colour or foliage than would otherwise be the case. Dipping in boiling water is also useful in the case of Heaths and other plants which are apt to shed their leaves during the process of drying.

234. Plants with very delicate corollas may be placed between single leaves of very thin unglazed tissue-paper. In shifting these plants into dry paper the tissue-paper is not to be removed, but lifted with its contents on to the dry paper.

235. The number of sheets of paper to be placed between each specimen or sheet of specimens, will depend, on the one hand, on the thickness and humidity of the specimens; on the other hand, on the quantity and quality of the paper one has at command. The more and the better the paper, the less frequently will it be necessary to change it, and the sooner the plants will dry. The paper ought to be coarse, stout, and unsized. Common blotting-paper is much too tender.

236. Care must be taken that the paper used is well dried. If it be likewise hot,

all the better; but it must then be very dry; and wet plants put into hot paper will require changing very soon, to prevent their turning black, for hot damp without ventilation produces fermentation, and spoils the specimens.

237. For pressing plants, various more or less complicated and costly presses are made. None is better than a pair of boards the size of the paper, and a stone or other heavy weight upon them if at home, or a pair of strong leather straps round them if travelling. Each of these boards should be double, that is, made of two layers of thin boards, the opposite way of the grain, and joined together by a row of clenched brads round the edge, without glue. Such boards, in deal, rather less than half an inch thick (each layer about 2½ lines) will be found light and durable.

238. It is useful also to have extra boards or pasteboards the size of the paper, to separate thick plants from thin ones, wet ones from those nearly dry, etc. Open wooden frames with cross-bars, or frames of strong wire-work lattice, are still better than boards for this purpose, as accelerating the drying by promoting ventilation.

239. The more frequently the plants are shifted into dry paper the better. Excepting for very stiff or woody plants, the first pressure should be light, and the first shifting, if possible, after a few hours. Then, or at the second shifting, when the specimens will have lost their elasticity, will be the time for putting right any part of a specimen which may have taken a wrong fold or a bad direction. After this the pressure may be gradually increased, and the plants left from one to several days without shifting. The exact amount of pressure to be given will depend on the consistence of the specimens, and the amount of paper. It must only be borne in mind that too much pressure crushes the delicate parts, too little allows them to shrivel, in both cases interfering with their future examination.

240. The most convenient specimens will be made, if the drying-paper is the same size as that of the herbarium in which they are to be kept. That of writing demy, rather more than 16 inches by 10½ inches, is a common and very convenient size. A small size reduces the specimens too much, a large size is both costly and inconvenient for use.

241. When the specimens are quite dry and stiff, they may be packed up in bundles with a single sheet of paper between each layer, and this paper need not be bibulous. The specimens may be placed very closely on the sheets, but not in more than one layer on each sheet, and care must be taken to protect the bundles by sufficient covering from the effects of external moisture or the attacks of insects.

242. In laying the specimens into the herbarium, no more than one species should ever be fastened on one sheet of paper, although several specimens of the same species may be laid side by side. And throughout the process of drying, packing, and laying in, great care must be taken that the labels be not separated from the specimens they belong to.

243. To examine or dissect flowers or fruits in dried specimens it is necessary to soften them. If the parts are very delicate, this is best done by gradually moistening them in cold water; in most cases, steeping them in boiling water or in steam is much quicker. Very hard fruits and seeds will require boiling to be able to dissect them easily.

244. For dissecting and examining flowers in the field, all that is necessary is a penknife and a pocket-lens of two or three glasses from 1 to 2 inches focus. At home it is more convenient to have a mounted lens or simple microscope, with a stage holding a glass plate, upon which the flowers may be laid; and a pair of dissectors, one of which should be narrow and pointed, or a mere point, like a thick needle, in a handle; the other should have a pointed blade, with a sharp edge, to make clean sections across the ovary. A compound microscope is rarely necessary, except in cryptogamic botany and vegetable anatomy. For the simple microscope, lenses of ¼, ½, 1, and 1½ inches focus are sufficient.

245. To assist the student in *determining* or ascertaining the name of a plant belonging to a Flora, analytical tables should be prefixed to the Orders, Genera, and Species. These tables should be so constructed as to contain, under each bracket, or equally indented, two (rarely three or more) alternatives as nearly as possible contradictory or incompatible with each other, each alternative referring to another bracket, or having under it another pair of alternatives further indented. The stu-

dent having a plant to determine, will first take the general table of Natural Orders, and examining his plant at each step to see which alternative agrees with it, will be led on to the Order to which it belongs, he will then compare it with the detailed character of the Order given in the text. If it agrees, he will follow the same course with the table of the genera of that Order, and again with the table of species of the genus. But in each case, if he finds that his plant does not agree with the detailed description of the genus or species to which he has thus been referred, he must revert to the beginning and carefully go through every step of the investigation before he can be satisfied. A fresh examination of his specimen, or of others of the same plant, a critical consideration of the meaning of every expression in the characters given, may lead him to detect some minute point overlooked or mistaken, and put him into the right way. Species vary within limits which it is often very difficult to express in words, and it proves often impossible, in framing these analytical tables, so to divide the genera and species, that those which come under one alternative should absolutely exclude the others. In such doubtful cases both alternatives must be tried before the student can come to the conclusion that his plant is not contained in the Flora, or that it is erroneously described.

246. In those Floras where analytical tables are not given, the student is usually guided to the most important or prominent characters of each genus or species, either by a general summary prefixed to the genera of an Order or to the species of the genus, for all such genera or species; or by a special summary immediately preceding the detailed description of each genus or species. In the latter case this summary is called a *diagnosis*. Or sometimes the important characters are only indicated by italicizing them in the detailed description.

247. It may also happen that the specimen gathered may present some occasional or accidental anomalies peculiar to that single one, or to a very few individuals, which may prevent the species from being at once recognised by its technical characters. It may be useful here to point out a few of these anomalies which the botanist may be most likely to meet with. For this purpose we may divide them into two classes, viz. :

(1.) *Aberrations from the ordinary type or appearance of a species for which some general cause may be assigned.*

A bright, light, and open situation, particularly at considerable elevations above the sea, or at high latitudes, without too much wet or drought, tends to increase the size and heighten the colour of flowers, in proportion to the stature and foliage of the plant.

Shade, on the contrary, especially if accompanied by richness of soil and sufficient moisture, tends to increase the foliage and draw up the stem, but to diminish the number, size, and colour of the flowers.

A hot climate and dry situation tend to increase the hairs, prickles, and other productions of the epidermis, to shorten and stiffen the branches, rendering thorny plants yet more spinous. Moisture in a rich soil has a contrary effect.

The neighbourhood of the sea, or a saline soil or atmosphere, imparts a thicker and more succulent consistence to the foliage and almost every part of the plant, and appears not unfrequently to enable plants usually annual to live through the winter. Flowers in a maritime variety are often much fewer, but not smaller.

The luxuriance of plants growing in a rich soil, and the dwarf stunted character of those crowded in poor soils, are too well known to need particularizing. It is also an everyday observation how gradually the specimens of a species become dwarf and stunted as we advance into the cold damp regions of the summits of high mountain-ranges, or into high northern latitudes; and yet it is frequently from the want of attention to these circumstances that numbers of false species have been added to our Enumerations and Floras. Luxuriance entails not only increase of size to the whole plant, or of particular parts, but increase of number in branches, in leaves, or leaflets of a compound leaf; or it may diminish the hairiness of the plant, induce thorns to grow out into branches, etc.

Capsules which, while growing, lie close upon the ground, will often become larger, more succulent, and less readily dehiscent, than those which are not so exposed to the moisture of the soil.

Herbs eaten down by sheep or cattle, or crushed underfoot, or otherwise checked in their growth, or trees or shrubs cut down to the ground, if then exposed to favourable circumstances of soil and climate, will send up luxuriant side-shoots, often so different in the form of their leaves, in their ramification and inflorescence, as to be scarcely recognisable for the same species.

Annuals which have germinated in spring, and flowered without check, will often be very different in aspect from individuals of the same species, which, having germinated later, are stopped by summer droughts or the approach of winter, and only flower the following season upon a second growth. The latter have often been mistaken for perennials.

Hybrids, or crosses between two distinct species, come under the same category of anomalous specimens from a known cause. Frequent as they are in gardens, where they are artificially produced, they are probably rare in nature, although on this subject there is much diversity of opinion, some believing them to be very frequent, others almost denying their existence. Absolute proof of the origin of a plant found wild, is of course impossible ; but it is pretty generally agreed that the following particulars must always co-exist in a *wild hybrid.* It partakes of the characters of its two parents; it is to be found isolated, or almost isolated, in places where the two parents are abundant ; if there are two or three, they will generally be dissimilar from each other, one partaking more of one parent, another of the other ; it seldom ripens good seed; it will never be found where one of the parents grows alone.

Where two supposed species grow together, intermixed with numerous intermediates bearing good seed, and passing more or less gradually from the one to the other, it may generally be concluded that the whole are mere varieties of one species. The beginner, however, must be very cautious not to set down a specimen as intermediate between two species, because it appears to be so in some, even the most striking characters, such as stature and foliage. Extreme varieties of one species are connected together by transitions in all their characters, but these transitions are not all observable in the same specimens. The observation of a single intermediate is therefore of little value, unless it be one link in a long series of intermediate forms, and, when met with, should lead to the search for the other connecting links.

(2.) *Accidental aberrations from the ordinary type, that is, those of which the cause is unknown.*

These require the more attention, as they may sometimes lead the beginner far astray in his search for the genus, whilst the aberrations above mentioned, as reducible more or less to general laws, affect chiefly the distinction of species.

Almost all species with coloured flowers are liable to occur occasionally with them all white.

Many may be found even in a wild state with double flowers, that is, with a multiplication of petals.

Plants which have usually conspicuous petals will occasionally appear without any at all, either to the flowers produced at particular seasons, or to all the flowers of individual plants, or the petals may be reduced to narrow slips.

Flowers usually very irregular, may, on certain individuals, lose more or less of their irregularity, or appear in some very different shape. Spurs, for instance, may disappear, or be produced on all instead of one only of the petals.

One part may be occasionally added to, or subtracted from, the usual number of parts in each floral whorl, more especially in regular polypetalous flowers.

Plants usually monœcious or diœcious may become occasionally hermaphrodite, or hermaphrodite plants may produce occasionally unisexual flowers by the abortion of the stamens or of the pistils.

Leaves cut or divided where they are usually entire, variegated or spotted where they are usually of one colour, or the reverse, must also be classed amongst those accidental aberrations which the botanist must always be on his guard against mistaking for specific distinctions.

INDEX OF TERMS, OR GLOSSARY.

The figures refer to the Paragraphs of the Outlines.

Par.
Aberrations 247
Abortive 84
Abruptly pinnate 43
Accessory organs 168
Accrescent = increasing in size after expansion of the flower.
Acicular 54
Achene 158
Aculeate 170
Acuminate, acumen 47
Acute 47
Adherent 140, 145
Adnate 63, 145
Adnate anther 114
Adventitious 17, 19
Aerial = growing in the air.
Æstivation 102
Aggregate fruit 147
Alabastrum (bud) 214
Alæ (wings) 37, 155
Alate = having wings.
Albumen, albuminous 162
Alburnum 198
Alliances 182
Alternate 32, 90
Amentum = catkin 76
Amphitropous 134
Amplexicaul 37
Amygdaloid = almond-like.
Amyloid 192
Anastomose 40
Anatropous 134
Androgynous 87
Angiospermous 161
Anisomerous 94
Annuals 12
Anterior 91
Anther 109, 114
Anthesis (flowering period) 214
Apetalous 85
Apex 36, 47, 115
Apiculate = with a little point.
Apocarpous 125
Aquatic = growing in water 14
Arboreous or arborescent plants 12
Aril, arillus 164
Arillate (having an aril) 164
Aristate 47
Article, articulate, articulation 54
Artificial divisions and characters 184
Ascending 28
Asepalous 85
Assimilation 218
Auricle 49
Auriculate = having auricles 50
Axil, axillary 17
Axile (in the axis) 132

Bark 198
Barren 85, 110
Base 36, 48, 115
Bast-cells 198
Berry 157
Bi- (2 in composition) 44
Bicarpellary 125
Bidentate 44
Biennials 12
Bifid 44
Bifoliolate 44
Bijugate 44
Bilabiate (two-lipped) 102, 105
Bilocular 126
Bipinnate 43
Bisexual 85
Biternate 44
Blade 35
Bracts, bractæ 60, 77, 202
Bracteate = having bracts.
Bracteoles 62
Bristles, bristly 173
Bud 16
Bulb 26
Bush 12

Caducous = very early deciduous.
Cæspitose = tufted 28
Callous = hardened and usually thickened.
Calycule, calyculate 80
Calyx 15, 90, 96
Cambium region 211
Campanulate 104
Campylotropous 134
Canescent 173
Capillary = hair-like 54
Capitate 74
Capsule 158
Carpel 15, 123
Carpophore 146
Cartilaginous = of the consistence of cartilage or of parchment.
Caruncule, carunculate 164
Caryopsis 160
Catkins 76
Cauline (on the stem) 38
Caulocarpic 12
Cells (elementary) 186
Cells (of anthers) 109
Cells (of the ovary) 121
Cellular system 193
Cellular tissue 188
Cellulose 191
Centrifugal 72
Centripetal 72
Chaff 82
Chalaza 133

	Par.
Character	183
Chartaceous	55
Chlorophyll	192
Chromule	192
Ciliate	39
Ciliolate = minutely ciliate.	
Circumsciss	158
Cirrhus = tendril	169
Class	182
Claw (of a petal)	107
Climbing stem	29
Coats of the ovule	133
Coats of the seed	163
Coccus	159
Coherent	145
Collateral = inserted one by the side of the other.	
Collection of specimens	224
Coma	163
Common petiole	39
Complete flower	89
Compound leaf	39
Compound flower	74
Compound fruit	147
Compound ovary	126
Compound umbel	74
Compressed	54
Conduplicate	166
Cone	160
Conferruminate	166
Confluent	117
Conical	54
Connate	145
Connective, connectivum	109
Connivent	145
Contorted, convolute	102
Contortuplicate	166
Cordate	49
Cordiform	49
Coriaceous	55
Corky layer	198
Corm	27
Corolla	15, 90, 97
Corrugate (crumpled)	102
Corymb, corymbose	74
Costate	173
Cotton, cottony	173
Cotyledons	166
Creeping	28
Crenate, crenulate	39
Cristate = having a crest-like appendage.	
Crown of the root	24
Crumpled	102
Crustaceous	55
Cryptogamous plants	10
Culm	34
Cuneate	45
Cupular (cup-shaped)	136
Cuspidate	47
Cylindrical	54
Cyme, cymose	74
Deca- or decem- (10 in composition)	44, 92
Deciduous calyx	152
Decompound	43
Decumbent	28
Decurrent	37
Decussate	32
Definite	89
Definitions	(p. i.)
Dehiscence, dehiscent	118, 156
Deltoid	45
Dentate	39
Depressed	54
Descriptive Botany	(p. i.)
Determinate	67
Determination of plants	245
Dextrine	192
Di- (2 in composition)	92
Diadelphous	113
Diagnosis	246
Dialypetalous	100
Diandrous	93
Dichlamydeous	85
Dichotomous	33
Diclinous	86
Dicotyledonous plants	167
Didymous	54
Didynamous	113
Diffuse	28
Digitate	41
Digynous	93, 125
Dimerous	93
Dimidiate	117
Diœcious	86
Dipetalous	93
Disepalous	93
Disk	136
Dissepiment	126
Dissected	39
Distichous	32
Distinct	145
Divaricate	115
Diverging, divergent	115, 145
Divided	39
Dorsal = on the back.	
Double flowers	97
Down, downy	173
Drupe	157
Dry fruits	158
Ducts	188
Duramen	198
Ear	76
Echinate	173
Elaborated sap	217
Elementary cells and tissues	186
Elliptical	45
Emarginate	47
Embryo	162, 166
Endocarp	157
Endogens, endogenous plants	195
Endogenous stem	199
Endosmose	217
Ennea- (9 in composition)	92
Entire	39
Epicalyx	80
Epicarp	157
Epidermis	173, 193
Epigynous	140
Epigynous disk	144
Epiphyte	14
Erect	28
Exalbuminous (without albumen)	162
Examination of plants	243
Exogens, exogenous plants	195
Exogenous stem	198
Exserted	113
Exstipulate = without stipules.	
Extrorse	118
Falcate	45
Families	181
Farinose	173
Fascicled, fasciculate	32
Fastigiate	74
Fecula	192
Female	85
Fertile	85
Fibre	18
Fibrous root	20
Fibro-vascular system	193
Filament	109
Filiform = thread-like.	
Fimbriate = fringed.	
Flabelliform = fan-shaped	45
Fleshy	55
Floccose	173
Floral envelope	15
Floral leaves	61
Flowers	15, 84, 213, 219
Flowering plants	10
Foliaceous = leaf-like.	
Follicle	159
Foramen	133
Forked	33

Par.
Foveolate . . . 105
Free 89, 132, 140, 145
Fruit . . . 15, 146, 222
Frutescent, fruticose . 12
Function . . . 7
Funicle (funiculus) . . 164
Funnel-shaped . . . 104
Furrowed . . . 173
Fusiform = spindle-shaped . . . 54

Gamopetalous . . . 100
Geminate . . . 32
Genus, genera . . . 180
Germ, germination . . 215
Gibbous . . . 105
Glabrate . . . 173
Glabrescent . . . 173
Glabrous . . . 173
Glands . . . 175, 206
Glandular-setose . . 173
Glaucescent . . . 173
Glaucous . . . 173
Globose, globular . . 54
Glochidiate . . . 173
Glume . . . 83
Glutinous . . . 173
Grain . . . 160
Gymnospermous . . . 161
Gynobasis, gynophore . 143

Habit . . . 183
Hairs . . 171, 205, 223
Hastate . . . 50
Head . . . 74
Heart-wood . . . 198
Hepta- (7 in composition) 92
Herbaceous perennials . 12
Herbarium . . . 224
Hermaphrodite . . . 85
Heterogamous . . . 87
Hexa- (6 in composition) 92
Hilum . . . 165
Hirsute . . . 173
Hispid . . . 173
Hoary . . . 173
Homogamous . . . 87
Hooks . . . 169
Hybernaculum . . . 23
Hybrids . . . 247
Hypocrateriform (salver-shaped) . . . 104
Hypogynous . . . 140

Imbricate, imbricated 58, 102
Imparipinnate . . . 43
Imperfect . . . 84
Incomplete . . . 84

Par.
Indefinite . . . 92
Indehiscent . . . 156
Indeterminate . . . 67
Indumentum . . . 171
Induplicate . . . 102
Inferior . . . 140
Inferior radicle . . . 167
Inflorescence . . . 66
Infundibuliform (funnel-shaped) . . . 104
Innate anther . . . 114
Insertion . . . 140
Internode . . . 31
Interrupted spike or raceme . . . 75
Introrse . . . 118
Involucre, involucel . 79
Involute . . . 102
Irregular . . . 95
Isomerous . . . 89

Joint, joining . . . 54
Jugum, juga = pairs . 44

Kernel . . . 157
Knob . . . 25

Labellum . . . 105
Laciniate . . . 39
Lamina . . . 35, 107
Lannate = woolly . . 173
Lanceolate . . . 45
Lateral . . . 91
Leaf, leaves 15, 35, 200, 218
Leaf-bud . . . 16
Leaflet . . . 39
Leaf-opposed . . . 67
Legume . . . 160
Lepidote . . . 172
Liber . . . 198, 211
Ligulate = strap-shaped.
Limb . . . 104
Linear . . . 45, 54
Lip, lipped . . . 105
Lobe, lobed . . . 39
Loculicidal . . . 158
Lower . . . 91
Lunate = crescent-shaped.
Lyrate . . . 41

Male . . . 85
Marcescent . . . 151
Mealy . . . 173
Medullary rays and sheath . . . 198
Membranous . . . 55
Meniscoid = in the form of a watch-glass.

Par
Mesocarp . . . 157
Micropyle . . . 165
Midrib . . . 40
Monadelphous . . . 113
Monandrous . . . 112
Moniliform . . . 54
Mono- (1 in composition) . . . 92
Monocarpellary . . . 125
Monocarpic . . . 12
Monochlamydeous . . 85
Monocotyledonous plants 167
Monœcious . . . 86
Monogynous . . . 125
Monopetalous . . . 100
Morphology . . . 8, 88
Mucronate . . . 47
Multi- (*many*, or an indefinite number, in composition) . . . 44
Muricate . . . 173

Naked . . . 85, 161
Natural divisions and characters . . . 184
Natural Order . . . 181
Navicular = boat-shaped.
Nectary . . . 138
Nerve . . . 40
Net-veined . . . 40
Neuter . . . 85
Node . . . 31
Novem- (9 in composition) . . . 44
Nucleus of a cell . . . 191
Nucleus of the ovule . 133
Nut . . . 158

Obcompressed . . . 54
Obconical . . . 54
Obcordate . . . 47
Oblate . . . 45
Oblong . . . 45, 54
Obovate . . . 45
Obovoid . . . 54
Obpyramidal . . . 54
Obtuse . . . 47
Oct- or octo- (8 in composition) . . . 44, 92
Offset . . . 23
Opposite . . . 32
Orbicular . . . 45
Order . . . 181
Organ . . . 7
Organogenesis . . . 213
Organs of vegetation and reproduction . . . 9
Orthotropous . . . 134

Par.
Oval . . . 45
Ovary . . . 121
Ovate . . . 45
Ovoid . . . 54
Ovule . . . 121, 133

Palate . . . 105
Palea, paleæ . . . 82
Paleaceous = of a chaffy consistence.
Palmate . . . 41, 42
Palmatifid, palmatisect 42
Panicle, paniculate . 74
Papillæ . . . 122
Pappus . . . 155
Parallel veins . . . 40
Parasite . . . 14
Parenchyma . . . 188
Parietal . . . 132
Patelliform = saucer-shaped.
Pectinate . . . 41
Pedate . . . 41, 42
Pedatifid, pedatisect . 49
Pedicel . . . 70
Pedicellate = on a pedicel.
Peduncle . . . 68
Pedunculate = on a peduncle.
Peltate . . . 52
Penicillate . . . 130
Penta- (5 in composition) 92
Pepo . . . 160
Perennial . . . 12
Perfect flower . . . 84
Perfoliate . . . 37
Perennials . . . 12
Perianth . 15, 98, 202, 220
Pericarp . . . 154
Perigynous . . . 140
Perisperm . . . 162
Persistent . . . 146
Personate . . . 105
Petal . . . 90
Petiole . . . 35
Petiolule . . . 39
Phænogamous, phanerogamous . . . 10
Phalange . . . 113
Phyllaries . . . 79
Phyllodium = a flat petiole with no blade.
Pilose . . . 173
Pinna . . . 43
Pinnate . . . 41, 42
Pinnatifid, pinnatisect . 42
Pistil 15, 90, 120, 203, 221
Pistillate . . . 85

Par.
Pith . . . 198
Placenta, placentation . 131
Plant . . . 6
Plicate . . . 102
Plumose . . . 172
Plumule . . . 166
Pluri- = *several*, in composition.
Plurilocular . . . 126
Pod . . . 158
Podocarp . . . 120
Pollen . . . 109, 119
Poly- (*many*, or an indefinite number, in composition) . . . 92
Polyadelphous . . . 113
Polyandrous . . 92, 112
Polygamous . . . 86
Polygynous . . 92, 125
Polypetalous . . . 100
Pome . . . 160
Posterior . . . 91
Præfoliation . . . 57
Preservation of specimens 224
Prickles . . . 170
Primine . . . 133
Procumbent . . . 28
Proliferous . . . 17
Prosenchyma . . . 188
Prostrate . . . 28
Protoplasm . . . 191
Pubescent, puberulent . 173
Pulvinate (cushion-shaped) . . . 136
Punctiform = like a point or dot.
Putamen . . . 157
Pyramidal . . . 54
Pyrenes . . . 157

Quadri- (4 in composition) . . . 44
Quincuncial . . . 102
Quinque- (5 in composition) . . . 44
Quintuplinerved . . . 40

Race . . . 178
Raceme, racemose . . 74
Rachis . . . 39, 68
Radical . . . 38
Radicle . . . 166
Raphe . . . 134
Raphides . . . 192
Receptacle . . 74, 135
Reduplicate . . . 102
Regular . . . 95
Reniform . . . 51

Par.
Resupinate . . . 105
Reticulate . . . 40
Retuse . . . 47
Revolute . . . 102
Rhachis . . . 39, 68
Rhaphe . . . 134
Rhizome . . . 21, 24
Rhomboidal . . . 45
Ribs . . . 40
Ribbed . . . 173
Ringent . . . 105
Root . 15, 18, 196, 207, 216
Root-stock . . . 24
Rostrate = beaked.
Rosulate . . . 38
Rotate . . . 104
Rudimentary . . . 84
Rugose . . . 173
Runcinate . . . 41
Runner . . . 30

Saccate . . . 105
Sagittate . . . 50
Salver-shaped . . . 104
Samara . . . 158
Sap . . . 192
Sapwood . . . 198
Sarcocarp . . . 157
Sarmentose . . . 28
Scabrous . . . 173
Scales . 58, 59, 172, 201
Scaly bulb . . . 26
Scaly surface . . . 172
Scape . . . 69
Scariose, scarious . . 55
Scattered . . . 32
Scion . . . 30
Scorpioid cyme . . . 74
Section . . . 182
Secund . . . 32
Secundine . . . 133
Seed . . . 161
Segment . . . 39
Sepals . . . 90
Septem- (7 in composition) . . . 44
Septicidal . . . 158
Septum = partition . . 126
Serrate, serrulate . . 39
Sessile . . . 37
Seta, setæ (bristles) . 173
Setaceous (bristle-like) . 54
Setose (bearing bristles) 173
Sex- (6 in composition) 44
Sheathing . . . 37
Shrubs . . . 12
Silicule, siliqua . . . 160
Silver grain . . . 198

Par.
Simple 39
Sinuate 39
Sinus 39
Smooth 173
Spadix 76
Spatha 81
Spathulate 45
Species 177
Specimen 225
Spherical 54
Spike, spicate 74
Spikelet 76
Spinous 170
Spiral vessels 188
Spur, spurred 105
Squamæ = scales 58
Squarrose 58
Stamens 15, 90, 108, 203
Staminate 85
Staminodia 110
Starch 192
Stellate 104
Stellate hairs 172
Stem 15, 28, 197, 210, 217
Stem-clasping 37
Sterile 85
Stigma 121
Stipella 64
Stipes, stipitate 65
Stipulate = with stipules.
Stipules 63
Stock 16, 22
Stole, stolon 23, 30
Stomates 194
Stone, stone-fruit 157
Striate 173
Strigose, strigillose 173
Strobiliform = in the form of a fir-cone.
Strophiole, strophiolate 164
Style 121
Sub = *almost*, or *under*, in composition.
Subclass, suborder 182
Submerged = under water.
Subulate 54
Succulent 55
Succulent fruits 157
Sucker 30
Suffrutescent, suffruticose 12
Sugar 192

Par.
Sulcate 173
Superior 140
Superior radicle 167
Superposed = inserted one above the other.
Suture 159
Symmetrical 89
Synandrous 112
Syncarpous 125
Syngenesious 113
Systematic Botany (p. xxiv.)

Taproot 20
Teeth 39, 101
Tegmen 163
Tendril 29, 169
Terete 54
Ternate 32, 41
Terrestrial = growing on the earth 14
Testa 163
Tetra- (4 in composition) 92
Tetradynamous 113
Thorns 170
Throat 104
Thyrsus, thyrsoid 74
Tissues (elementary) 186
Tomentose 173
Toothed 39
Torulose 54
Torus 135
Trees 12
Tri- (3 in composition) 44, 92
Tribe 182
Trichotomous 33
Trifid 41
Trifoliolate 41
Trigonous 54
Tripinnate 43
Triplinerved 40
Triquetrous 54
Tristichous 32
Truncate 47
Trunk 12
Tube 101, 104
Tuber, tuberous, 20, 25, 204
Tuberculate 173
Tubular 104
Tufted 28
Tunicated bulb 27
Turbinate = top-shaped 54

Par.
Twiner 29
Twisted 102
Type, typical 181

Umbel, umbellate, umbellule 33, 74
Umbilicate 173
Umbonate 173
Uncinate = hooked.
Undershrubs 12
Undulate 39
Unequally pinnate 43
Unguiculate 107
Unguis (claw) 107
Uni- (1 in composition) 44
Unilateral (one-sided) racemes 74
Unilocular 126
Unisexual 86
Unsymmetrical 94
Upper 91
Urceolate 104
Utricle 158

Valvate 102
Valves 158
Variety 178
Vascular tissue 188
Vegetable Anatomy 8, 186
Vegetable Chemistry 8
Vegetable Homology or Metamorphosis 88
Vegetable Physiology 8, 207
Veins, veinlets, venation 40
Vernation 57
Versatile anther 114
Verticil, verticily 32
Vessels 188
Virgate = twiggy 28
Viscid, viscous 173
Vitta, vittæ 175
Viviparous 17
Voluble 29

Wart, warted 173
Wavy 39
Whorl, whorled 32
Wing, winged 37, 155
Wood 198
Woody tissue 188
Wool, woolly 173

FLORA OF BRITISH INDIA.

ORDER I. **RANUNCULACEÆ.** (By Hooker f. & Thomson.)

Annual or perennial herbs, rarely shrubs. *Leaves* radical or alternate (opposite in *Clematideæ*). *Stipules* 0, or adnate to the petiole, rarely free. *Flowers* regular or irregular, 1–2-sexual, rarely bracteate. *Disk* very rarely present (*Pæonia*). *Sepals* 5 or more, rarely 2–4, deciduous (persistent in *Pæonia*), often petaloid, imbricate (valvate in *Clematis*). *Petals* 0, or 3–5 or more, hypogynous, imbricate, often minute or deformed. *Stamens* hypogynous; anthers usually adnate and dehiscing laterally. *Carpels* usually many, free, 1-celled; stigma simple; ovules one or more on the ventral suture, anatropous, erect with a ventral or pendulous with a dorsal raphe. *Fruit* of numerous 1-seeded achenes, or many-seeded follicles, rarely a berry. *Seed* small, albumen copious; embryo minute.—DISTRIB. Abundant in temperate and cold regions; genera 30, known species about 300.

TRIBE I. **Clematideæ.** Erect or climbing shrubs. *Leaves* opposite. Sepals petaloid, valvate. *Carpels* 1-ovuled; ovule pendulous. *Fruit* of many achenes.

Petals 0	1. CLEMATIS.
Petals many, linear	2. NAVAVELIA.

TRIBE II. **Anemoneæ.** Herbs. *Leaves* radical or alternate. *Sepals* petaloid, imbricate. *Carpels* 1-ovuled; ovule pendulous. *Fruit* of many achenes.

Petals 0, flowers involucrate	3. ANEMONE.
Petals 0, flowers not involucrate	4. THALICTRUM.
Petals 5–15, with a nectariferous pit	5. CALLIANTHEMUM.
Petals 5–16, with no nectariferous pit	6. ADONIS.

TRIBE III. **Ranunculeæ.** Herbs. *Leaves* radical or alternate. *Sepals* herbaceous, imbricate. *Carpels* 1-ovuled; ovules erect. *Fruit* of many achenes.

Sepals 3–5, deciduous, petals usually 5	7. RANUNCULUS.
Sepals 5 persistent, petals 10–15	8. OXYGRAPHIS.

TRIBE IV. **Helleboreæ.** Herbs or undershrubs. *Leaves* alternate. *Sepals* petaloid or herbaceous, imbricate. *Carpels* several, many-ovuled. *Fruit* of 1 or more follicles (berried in *Actæa*).

Flowers regular solitary or panicled.	
Petals 0, leaves undivided	9. CALTHA.
Petals 0, leaves palmately divided	10. CALATHODES.
Petals small, carpels long-stalked	12. COPTIS.
Petals small, carpels sessile, flowers yellow	11. TROLLIUS.
Petals small, carpels sessile, flowers white	13. ISOPYRUM.
Petals as large as the sepals, all spurred	14. AQUILEGIA.
Flowers regular racemed.	
Carpel solitary, berried when ripe	17. ACTÆA.
Carpels 4–8, follicular when ripe	18. CIMICIFUGA.
Flowers irregular.	
Posterior sepal spurred	15. DELPHINIUM.
Posterior sepal vaulted	16. ACONITUM.

TRIBE V. **Pæonieæ.** Herbs or undershrubs. *Sepals* herbaceous, imbricate. *Carpels* several, several-ovuled, girt by a fleshy disk. *Fruit* of coriaceous few-seeded follicles.

19. PÆONIA.

1. **CLEMATIS,** Linn.

Woody, usually climbing undershrubs. *Leaves* opposite, usually compound, exstipulate, petioles often twining. *Inflorescence* axillary or terminal. *Sepals* usually 4, (to 8) petaloid, valvate. *Petals* 0. *Stamens* many. *Carpels* many, each with 1 pendulous ovule. *Fruit* a head of sessile or stalked achenes, with long feathery styles, except in Sect. *Viticella*.—DISTRIB. All temperate climates, rarer in the tropics; species about 100.

SECT. I. **Viticella,** *DC.* *Achenes* beaked, without feathery styles.

1. **C. Cadmia,** *Ham. ex Wall. Cat.* 4669; *H. f. & T. Fl. Ind.* 5; C. sulcata, *Wall. Cat.* 4667. Thalictrum bracteatum, *Roxb. Fl. Ind.* ii. 671.

E. BENGAL in tropical jungles, and along the base of the HIMALAYA, from the Kosi to Assam. BIRMA, *Griffith.*

A slender subherbaceous climber. *Leaves* 3-nately decompound; leaflets 1–2 in. ovate-oblong, glabrous, base oblique or cordate. *Flowers* axillary, solitary; peduncle long, with two leafy bracts about the middle. *Sepals* 5 to 6, $\frac{3}{4}$ to 1 in. spreading, linear-oblong, blue. *Achenes* many, large, broadly ovate, beak long straight, young silky.

SECT. II. **Cheiropsis,** *DC.* *Achenes* with long feathery styles. *Flowers* in axillary fascicles; pedicels 1-fld.

2. **C. Napaulensis,** *DC. Syst.* i. 164; leaves ternately divided, pedicels with 2 connate bracts at or near the middle. *H. f. & T. Fl. Ind.* 6; *Wall. Cat.* 4680. C. montana, *Don Prodr.* 192 (not of others).

TEMPERATE HIMALAYA from Garwhal to Bhotan.

A slender nearly glabrous climber. *Leaflets* 1–2 in., elliptic-lanceolate, sometimes very narrow, entire toothed or 3-lobed, 3-nerved, lateral oblique. *Flowers* many, pedicels shorter than the leaves; bracts forming a 2-lipped cup, in which the bud is sessile. *Sepals* 4, oblong, silky outside. *Filaments* glabrous, tapering from a broad flat base; anthers short. *Achenes* flat, margined, hairy.

3. **C. montana,** *Ham. ex DC. Syst.* i. 164; leaves ternately divided, pedicels naked, stamens glabrous. *Wall. Pl. As. Rar.* iii. t. 217; *H. f. & T. Fl. Ind.* 5. C. Punduana, *Wall. Cat.* 4862. C. anemoniflora, *Don Prodr.* 192; Anemone curta, *Wall. Cat.* 4690.

Temperate Himalaya from the Indus to the Bramaputra, ascending to 12,000 ft., always above 8500 ft. in Sikkim. Khasia hills above 4000 ft.

A woody climber, glabrous or silky. *Leaves* fascicled at the nodes; leaflets ovate, toothed or incised, usually acute. *Flowers* 2 to 4 in. diam., often scented, white or pinkish or yellowish; pedicels exceeding the leaves. *Sepals* 4, elliptic, acute or obtuse, glabrous or silky outside. *Filaments* narrow-linear; anthers short. *Achenes* flat, glabrous; receptacle pilose.

4. **C. barbellata,** *Edgew. in Trans. Linn. Soc.* xx. 25; leaves once ternately divided, pedicels naked, anthers softly bearded on the back. *Hook. Bot. Mag.* t. 4794; *H. f. & T. Fl. Ind.* 5. C. nepaulensis, *Royle Ill.* 51 (not of others).

Western Temperate Himalaya in Garwhal and Kumaon, *Royle*, &c.

A woody climber, glabrous or nearly so. *Leaflets* ovate-lanceolate, acute, toothed or lobed. *Flowers* large, dull purple. *Sepals* oblong, acuminate, pubescent on both surfaces, margins villous. *Filaments* broadly linear, 1-nerved, often ciliate with long hairs; anther-cells introrse. *Achenes* glabrous.

5. **C. acutangula,** *H. f. & T. Fl. Ind.* 5; leaves 2-pinnate, pedicels 2-bracteate at the base rarely in the middle, anthers softly hairy.

Khasia Hills, near Molim, alt. 5000 ft. *Griffith, H. f. & T.*

A slender, hardy woody climber. *Stem* angled, deeply furrowed, slightly hairy. *Leaflets* 1–2 in., ovate or ovate-lanceolate, acute, crenate or 3-lobed. *Flowers* brownish-yellow; pedicels 1–3-nate, short. *Sepals* oblong, acute, pubescent outside. *Filaments* narrow-linear, 1-nerved, pilose; anthers introrse. *Achenes* flat, margined, pubescent.—Intermediate between this and the following section.

Sect. III. **Flammula,** *DC.* *Achenes* with long feathery tails. *Flowers* in axillary panicles.

* Sepals spreading from the base.

† *Filaments glabrous; connective of anthers not produced.*

6. **C. smilacifolia,** *Wall. in Asiat. Researches,* xiii. 414; *Cat.* 4683; glabrous, leaves large usually simple ovate or cordate coriaceous entire or remotely serrate. *Bot. Mag.* t. 4259; *H. f. & T. Fl. Ind.* 6. C. subpeltata, *Wall. Pl. As. Rar.* i. t. 20; *Cat.* 4868. C. Munroana, *Wight Ill.* i. 5, t. 1. C. smilacina, *Blume Bijd.* 1.

Himalaya from Sikkim eastwards, ascending to 5000 ft. Khasia hills; Concan; Travancor; Ava.—Distrib. Java, Borneo, Philippines.

A tall, glabrous, woody climber. *Leaves* 3–10 by 1–7 in., rarely once ternate, upper smaller, narrower and cuneate at the base. *Panicles* 6–12 in. *Flowers* 1–1½ in. diam. *Sepals* 4–5, coriaceous, oblong, at length reflexed, outside dull-brown tomentose, inside deep purple. *Filaments* membranous, linear, glabrous, inner shorter with longer anthers; connective produced. *Achenes* flat, pubescent, margins broad.

7. **C. triloba,** *Heyne in Roth. Nov. Sp.* 251; silky, leaves small simple or once ternate entire or 1–3-toothed or -lobed. *DC. Prodr.* i. 8; *W. & A. Prodr.* i. 2; *H. f. & T. Fl. Ind.* 7.

Mountains of the Mâwal district of the Dekkan, and W. Concan.

An extensive climber. *Leaves* or *leaflets* 1–2 in., elliptic-ovate or cordate, 3-nerved. *Panicle* many-flowered; lower bracts leafy. *Flowers* 1½–2 in. diam., white. *Sepals* 4–6, membranous, oblong, silky outside. *Filaments* narrow-linear, glabrous.

8. **C. grata,** *Wall. Cat.* 4668; *Pl. As. Rar.* i. t. 98; hoary-pubescent, leaves simply pinnate. *H. f. & T. Fl. Ind.* 7.

Subtropical and Temperate Himalaya, from Kumaon westwards, alt. 2–8000 ft. —Distrib. Affghanistan, China, trop. Africa.

A woody climber. *Stem* deeply furrowed. *Leaflets* about 5, 1–2 in., broadly ovate or cordate, acuminate, inciso-serrate or 3-lobed, villous on both surfaces or glabrate above. *Panicles* often exceeding the leaves, decompound. *Flowers* ¾–1 in. diam., cream-coloured. *Sepals* tomentose outside. *Filaments* narrow-linear; anthers short. *Achenes* densely pubescent.—Variable in habit and pubescence.

9. **C. Gouriana,** *Roxb. Fl. Ind.* ii. 670; usually glabrous, leaves pinnate 2-pinnate or 2-ternate, flowers very small in dense panicles. *DC. Prodr.* i. 3; *Wall. Cat.* 4673; *W. & A. Prodr.* 2; *Wight Ic.* t. 933–4; *H. f. & T. Fl. Ind.* 8. C. cana, *Wall. Cat.* 4672. C. Javana, *DC. Prodr.* i. 7.

Hilly districts from the WESTERN HIMALAYA, alt. 1–3000 ft. to CEYLON and the EASTERN PENINSULA.—DISTRIB. Java, Philippines.

An extensive climber, young parts pubescent. *Leaflets* membranous, ovate-oblong or cordate, acuminate, shining above, sometimes pubescent beneath. *Panicles* usually exceeding the leaves. *Flowers* ⅓–½ in. diam., yellowish or greenish-white. *Sepals* obovate or oblong, revolute, puberulous, edges tomentose. *Filaments* narrow-linear. *Achenes* narrow-oblong, hairy.—Resembles *C. vitalba*, and is very variable; two forms with many intermediates are widely diffused, one with larger leaflets tomentose below and less shining above, the other with leaves glabrous on both surfaces.

10. **C. puberula,** *H. f. & T.*; pubescent, leaves pinnate, leaflets simple or 3-sect, flowers small few (3–9) in a lax panicle.

WESTERN TEMPERATE HIMALAYA, from Simla to Garwhal; KHASIA HILLS, alt. 2-4000 ft.

Climbing *Stem* deeply grooved, slender, downy. *Leaflets* membranous, 1–1½ in., ovate-lanceolate, entire or remotely toothed, pubescence scattered. *Panicles* shorter than the leaves; pedicels slender. *Sepals* ½ in., linear-oblong, acute, 3-nerved, silky outside. *Filaments* narrow-linear; anthers short. *Achenes* silky.—Confounded in Fl. Ind. with *C. nutans.*

†† *Filaments glabrous; connective of anther more or less produced.*

11. **C. hedysarifolia,** *DC. Syst.* i. 148; nearly glabrous, leaves simply pinnate, leaflets reticulate, connective much produced. *H. f. & T. Fl. Ind.* 7. (*Excl. citation of Bot. Reg.*)

CONCAN, *Law*; BELGAUM, *Ritchie*; PEGU, *Hore* (in Brit. Mus.).

A woody climber. *Leaflets* 3–5, 2–4 in., coriaceous, ovate or cordate, acuminate, entire or coarsely toothed. *Panicles* many-flowered. *Flowers* ¾ in. diam. Sepals 4–5, long-acuminate. *Anther-cells* marginal. *Achenes* hairy, margins tubercled.

12. **C. apiculata,** *H. f. & T.*; pubescent, leaves 3-foliolate long petioled, connective very shortly produced.

KHASIA HILLS; Nunklow, *Griffith*; Churra, *H. f. & T.*

A woody climber. *Leaflets* short-stalked, ovate-oblong, acute, base rounded, coarsely toothed from the middle upwards. *Panicles* many-flowered. *Flowers* small. *Sepals* ⅙–¼ in., oblong, tomentose outside. *Filaments* broadly linear, short, scarcely exceeding the anthers. *Achenes* broadly oval, hairy.

††† *Filaments hairy; connective of anther not produced.*

13. **C. graveolens,** *Lindl. in Journ. Hort. Soc.* i. 307; glabrous except the flowers, leaves pinnately decompound, sepals elliptic obtuse. C. parvifolia, *H. f. & T. Fl. Ind.* 9 (*not of Edgeworth*).

WESTERN TEMPERATE HIMALAYA, from Marri to Kulu and Kumaon, alt. 6–11,000 ft.

A slender climber. *Leaflets* ½–1 in., toothed or incised, or 3-lobed or -partite, terminal segment oblong, acute or obtuse. *Panicles* 3-7-flowered; upper flowers often solitary with a pair of pinnate leafy bracts on the peduncle. *Flowers* 1½–2 in. diam., pale yellow, odour heavy. *Sepals* pubescent outside, densely tomentose inside. *Filaments* narrow-linear. *Achenes* pubescent.—Resembles the European *C. Flammula.*

14. **C. orientalis,** *L.;* glabrous, glaucous, leaves pinnate or 2-pinnate, sepals ovate acuminate. *H. f. & T. Fl. Ind.* 9.

Western Himalaya, dry inner valleys from the Indus to Kumaon, ascending to 14,000 ft. Western Tibet, T. T.—Distrib. Temp. Asia, from Persia to Manchuria.

A large woody climber, branchlets sometimes puberulous. *Leaflets* 1–2 in., orbicular to ovate-lanceolate or lanceolate, entire toothed or cut. *Panicles* many-flowered. *Flowers* 1½ in. diam., yellow or mottled with purple. *Sepals* 4, villous outside or on both surfaces, edges tomentose. *Filaments* membranous, tapering from a broad base, silky or ciliate. *Achenes* oblong, silkily hairy.—Very variable.

Var. 1. *acutifolia;* leaves oblong-lanceolate acute or acuminate, flowers usually large. C. tenuifolia, *Royle Ill.* 51. C. graveolens, *Hook. Bot. Mag.* t. 4495 (not of Lindl.). C. parvifolia, *Edgew. in Linn. Trans.* xx. 25. C. Ispahanica, *Boiss. Fl. Orient.* i. 3 (*flowers small*). C. longicaudata, *Ledeb. Fl Ross.* i. 3.

Var. 2. *obtusifolia;* usually very glaucous, leaves oblong obtuse, flowers small or middle-sized. C. glauca, *Willd.*

Var. 3. *latifolia;* glaucous, leaves orbicular or oval obtusely lobed, flowers middle-sized. C. globosa, *Royle Ill.* 51. C. albida, *Klotzsch in Bot. Reis. Pr. Wald.* t. 40.

15. **C. Wightiana,** *Wall. Cat.* 4674; softly downy, leaves pinnate, sepals broadly ovate. *W. & A. Prodr.* 2; *Wight Ic.* t. 935; *H. f. & T. Fl. Ind.* 10.

Hills of the Dekkan, Orissa, Concan and Nilghiri, ascending to 7000 ft., *Wight*, &c.

A large woody climber. *Leaflets* usually 5, 2 in., orbicular- or ovate-cordate, 3–5-lobed, densely villous and brown below, at length glabrate above. *Flowers* 2–2½ in. diam., in decompound panicles. *Sepals* 4, brown-tomentose outside. *Filaments* narrow-linear, silky below the middle, glabrous at the base and tip; anthers short. *Achenes* silky.

** Sepals erect, with recurved tips. Filaments hairy; connective not produced.

16. **C. nutans,** *Royle Ill.* 51; silkily pubescent, leaves decompoundly pinnate. *H. f. & T. Fl. Ind.* 10.

Western subtropical Himalaya, from the Sutlej to Kumaon, alt. 2–5000 ft., *Royle*, &c. Khasia hills, at Nurtiung, alt. 4000 ft., *H. f. & T.* Behar, on Parasnath, alt. 2000 ft.

Stem furrowed, slender, woody, climbing. *Leaflets* 1–3 in., ovate oblong or lanceolate, deeply acutely or obtusely 3–5-lobed, rarely entire. *Flowers* 1½–3 in. diam., in much branched many-flowered panicles, pale yellow. *Sepals* oblong, many-nerved, silky outside. *Filaments* narrow-linear, silky below the middle, tapering upwards; anthers short. *Achenes* large, ovate, silky-hairy.

17. **C. acuminata,** *DC. Syst.* i. 148; glabrous except the flowers, leaves once ternate, rarely simple. *Don Prodr.* 192; *Wall. Cat.* 4670; *H. f. & T. Fl. Ind.* 11.

Temperate Himalaya, from Garwhal to Bhotan. Upper Assam, Mishmi and Patkay, *Griffith.*

A large, woody, slender, branched climber. *Leaflets* 3–5 in., ovate or ovate-lanceolate, acuminate, shining, quite entire or minutely distantly toothed. *Flowers* 1–1½ in. diam., in decompound (sometimes few-flowered) panicles. *Sepals* oblong-lanceolate, more or less pubescent outside, suberect or spreading. *Filaments* narrow-linear, ciliate with long spreading hairs throughout. *Achenes* silky.—The following varieties may prove species:—

VAR. 1. *Wallichii;* more slender, leaflets smaller narrower more membranous, flowers fewer larger, buds tomentose.—W. Himalaya, Nepal, Bhotan.

VAR 2. *Sikkimensis;* leaflets larger, coriaceous, flowers very numerous, smaller, buds glabrous except the margins of the sepals.—Sikkim, alt. 5–7000 ft., *H. f. & T.* Mishmi and Naga hills, *Griffith.*

18. **C. connata,** *DC. Prodr.* i. 4; glabrous, leaves pinnate, sepals not ribbed, filaments tapering to a point. *Wall. Cat.* 4679; *H. f. & T. Fl. Ind.* 11. C. venosa, *Royle Ill.* 51; C. amplexicaulis, velutina, and gracilis, *Edgew. in Trans. Linn. Soc.* xx. 24.

TEMPERATE HIMALAYA, from Hazara to Sikkim, alt. 4–10,000 ft.

A large woody climber, young parts with scattered hairs. *Leaflets* 3–7, distant, 2–4 in., broadly ovate-cordate, coarsely serrate or sub-3-lobed. *Flowers* in many-flowered panicles. *Sepals* oblong, subacute, pubescent outside, densely tomentose inside. *Filaments* narrow-linear below, hairy; anthers short. *Achenes* silky-pubescent.—Closely allied to *C. Buchananiana*, but smoother, smaller flowered, and leaflets narrower; petioles often connate into a coriaceous or woody flat expansion.

19. **C. Buchananiana,** *DC. Syst.* i. 140; hoary or coarsely hairy, leaves simply pinnate, sepals ribbed, filaments linear. *H. f. & T. Fl. Ind.* 10.

Throughout the TEMPERATE HIMALAYA, alt. 5–10,000 ft. MISHMI, *Griffith.*

A large woody climber. *Leaflets* 5–7, 2–3 in., broadly ovate or suborbicular-cordate, obtuse or acute, coarsely serrate or 3–5-lobed. *Flowers* 2–3 in. diam., in branched many-flowered panicles, often sweet-scented. *Sepals* linear-oblong, many-ribbed, tomentose on both surfaces. *Filaments* densely hairy; anthers elongate. *Achenes* densely hairy.—Very variable, roughly divisible as follows:—

VAR. 1. *rugosa;* stem tomentose, leaves rugose and reticulate white and hoary especially beneath. C. Buchananiana, *Wall. Cat.* 4677.

VAR. 2. *vitifolia* (sp. *Wall. Cat.* 4676); stem pubescent, leaves membranous slightly pubescent.

VAR. 3. *tortuosa* (sp. *Wall. Cat.* 4675); stem with long soft fibrous hairs, leaves glabrous or veins only silky.

20. **C. grewiæflora,** *DC. Syst.* i. 140; densely tomentose, leaves simply pinnate, filaments filiform above. *Don Prodr.* 191; *Wall. Cat.* 4678; *H. f. & T. Fl. Ind.* 10.

LOWER TEMPERATE AND SUBTROPICAL HIMALAYA, alt. 3–5000 ft., from Kumaon to Bhotan.

A large woody climber. *Leaflets* 3–5, 3–4 in., broadly ovate-cordate, more or less serrate, usually deeply 5-lobed. *Panicles* many-flowered. *Sepals* 1½ in., oblong, densely tomentose outside, pubescent inside. *Filaments* 1 in., narrow-linear below, covered with soft spreading hairs; anthers very long, narrow, twisted after flowering.

DOUBTFUL SPECIES.

C. LOASÆFOLIA, *DC. Syst.* i. 140; flowerless, doubtless either *C. grewiæflora* or *Wightiana.*

C. LOASIFOLIA, *Don Prodr.* 191. Probably *C. Buchananiana.*

C. SCABIOSÆFOLIA, *DC. Syst.* i. 154. India? Herb. Mus. Paris.

C. VILLOSA, *DC. Syst.* i. 154. India? Herb. Mus. Paris.

C. COMOSA, *DC. Syst.* i. 156. India? Herb. Mus Paris. (*C. triloba?*)

C. GROSSA, *Wall. Cat.* 4671 (*not of Benth.*) Ava; too imperfect for determination.

2. NARAVELIA, DC.

Climbing shrubs. *Flowers* in axillary 1-flowered peduncles. *Leaves* 3-foliolate, terminal leaflet generally transformed into a tendril. *Sepals*

4–5. *Petals* 6–12, narrow, longer than the calyx. *Achenes* narrow, long, stipitate, with long-bearded styles.—Distrib. Two E. Asiatic species.

1. **N. zeylanica,** *DC. Syst.* i. 167; more or less pubescent, leaflets broad-ovate, sepals linear-spathulate. *Wall. Cat.* 4687; *W. & A. Prodr.* 2; *H. f. & T. Fl. Ind.* 3. Atragene zeylanica, *L.; Roxb. Cor. Pl.* ii. t. 188; *Fl. Ind.* ii. 670.

Tropical forests of the Himalaya, from E. Nepal eastward, Bengal, Assam, E. and W. Peninsulas, Ceylon.—Distrib. Java.

Leaflets usually cordate at the base, entire or coarsely toothed, often tomentose below, sometimes pubescent on the nerves only. *Flowers* ½–¾ in. diam. *Sepals* pubescent outside, twice as long as the glabrous petals.

2. **N. laurifolia,** *Wall. Cat.* 4685; glabrous, leaflets narrow acuminate, base usually acute, petals very long linear not spathulate. *H. f. & T. Fl. Ind.* 3. N. Finlaysoniana, *Wall. Cat.* 468 (achenes diseased, subulate, beardless, corky, seedless).

Eastern Peninsula; Mergui to Malacca and Penang.—Distrib. Eastward to the Philippines.

3. ANEMONE, Linn.

Perennial herbs. *Leaves* radical, lobed or divided. *Flowers* on 1- or more-flowered simple or branched scapes; involucre 3-partite, bracts free or connate. *Sepals* 4–20, petaloid, imbricate. *Petals* 0. *Stamens* many, outer sometimes deformed or petaloid. *Carpels* many; ovule 1, pendulous. *Fruit* a head of sessile achenes, with short or long naked or bearded styles. —Distrib. Cold and temperate regions, very rare in the S. hemisphere; species 80.

Sect. I. **Pulsatilla,** *DC. Achenes* with long feathery styles.

1. **A. albana,** *Stev. in Mem. Soc. Hist. Nat. Mosc.* iii. 264; softly hairy, leaves pinnatisect, sepals erect. *DC. Prodr.* i. 17; *H. f. & T. Fl. Ind.* 19. A. Wallichiana, *Royle Ill.* 52.

West Tibet; above 15,000 ft., *Jacquemont*, &c.—Distrib. N. Asia, from Armenia to Baikal.

Densely tufted. *Rootstock* thick, woody, clothed with old leaf-sheaths. *Leaf-segments* pinnatifid; ultimate broadly linear, incised. *Scape* 6 in., fruiting 12 in. *Invol. leaves* connate at the base, 3-fid or pinnatifid above. *Flowers* solitary, nodding, dull red-brown. *Sepals* with erect tips, silky outside, about as long as the stamens.—Probably an alpine state of the European *A. pratensis*, but the invol. is less divided. Tibetan specimens are usually smaller than the Siberian, but not always.

Sect. II. **Eriocephalus,** *H. f. & T. Achenes* with short styles, imbedded in dense wool.

2. **A. biflora,** *DC. Syst.* i. 201; rootstock tuberous, scape glabrous, leaves 3-partite or 3-foliolate, segments rounded, flowers 1–3 small *H. f. & T. Fl. Ind.* 20. A. Gordschakowii, *Kar. & Kir. in Pl. Soong.* No. 14. —*Griff. It. notes,* 349.

Kashmir; in dry stony places, alt. 4–6000 ft.—Distrib. Turkestan and E. to Persia

Scape 2–8 in., slender, usually quite glabrous. *Radical leaves* long-petioled; segments suborbicular or broadly cuneate, palmately-lobed or partite. *Invol. leaves* sessile, lobed to the middle. *Flowers* dull red; pedicels pubescent, lateral with a 2-leaved involucre, the terminal naked.

3. **A. rupicola,** *Camb. in Jacq. Voy. Bot.* 5, t. 2; rootstock long slender woody, scape silky, leaves 3-partite, segments acutely toothed or cut, flowers 1–2 large. *H. f. & T. Fl. Ind.* i. 20.

Inner alpine valleys of the HIMALAYA, from Gores and Kashmir to Sikkim, alt. 12–15,000 ft., *Jacquemont*, &c.

Scape 12 in., softly silky. *Radical leaves* long-petioled, segments more or less petioled, sharply incised or 3-lobed. *Invol. leaves* almost sessile, 3-lobed to the middle; segments toothed and cut. *Flowers* showy; lateral pedicels involucellate. *Sepals* 1–1½ in., broadly oval, downy outside. *Achenes* in an oval head.—Variable in pubescence and acuteness of leaf-lobes.

VAR. 1. *sericea;* leaves coarsely toothed, softly silky.

VAR. 2. *glabriuscula;* nearly glabrous, leaves sharply cut.

4. **A. vitifolia,** *Ham. ex DC. Syst.* i. 210; rootstock stout woody, scape branched many-flowered, leaves orbicular-cordate. *Don Prodr.* 193; *Hook. Bot. Mag.* t. 3376; *Wall. Cat.* 4695; *H. f. & T. Fl. Ind.* 20.

TEMPERATE HIMALAYA, alt. 5–10,000 ft.: in Sikkim found only on the inner ranges. MISHMI, *Griffith.*

Stem 1–3 ft, stout, erect, branched. *Radical leaves* 4–8 in. diam., deeply 5-lobed, glabrous above, densely tomentose beneath; lobes sharply lobulate and cut. *Invol. leaves* petiolate, like the radical. *Flowers* 1½–2 in. diam, white, in decompound cymes; lateral peduncles involucellate. *Sepals* 5–8, silky outside. *Achenes* in large heads.—Habit of *A. japonica,* but leaves 3-foliolate.

SECT. III. **Anemonanthea,** *DC.* *Achenes* tipped by a short style, not imbedded in wool, oblong cylindric or slightly compressed.

5. **A. Griffithii,** *H. f. & T. Fl. Ind.* 21; rootstock horizontal woody, invol. leaves like the radical long-petioled free, scape 1–2-flowered.

EAST HIMALAYA, Lachen valley in Sikkim, alt. 8–9000 ft., *H. f.*; BHOTAN, near Chuka, alt. 6000 ft., and MISHMI HILLS, *Griffith.*

A small plant. *Leaves* 3-partite; segments cuneate at the base, tapering upwards to a point, 3-lobed; lobes inciso-crenate. *Flowers* 1 in. diam., white or pinkish.—Habit of *A. nemorosa,* L., and *A. ranunculoides,* L.

6. **A. Falconeri,** *Thoms. in Hook. Ic. Pl.* t. 899; rootstock short stout fibrous, invol. leaves small sessile connate, flowers solitary. *H. f. & T. Fl. Ind.* 21. Hepatica sp., *Falc. in Royle Ill.* 25 (*in note*).

WEST TEMPERATE HIMALAYA, in shady woods; Kashmir, *Falconer;* Kishtwar, *Thomson;* Hazara, *J. L. Stewart.*

Softly hairy. *Radical leaves* many, long-petioled, 3-partite; segments ovate-cuneate, lobed. *Scapes* 3-6 in.; *invol. leaves* oblong, entire or obtusely 3-lobed. *Flowers* ⅓–½ in. diam., white, shortly pedicelled. *Achenes* oblong, angled, silky.—Habit of *Hepatica,* but flowers pedicelled.

7. **A. obtusiloba,** *Don Prodr.* 194; rootstock woody fibrous, radical leaves 3-partite, segments broad sessile, invol. leaves small sessile free, scape 1–3-flowered. *H. f. & T. Fl. Ind.* 22. A. Govaniana, *Wall. Cat.* 4688. A. discolor, *Royle Ill.* 52. t. 11, *f.* 1. A. micrantha, *Klotzsch in Bot. Reis. Pr. Waldem.* t. 38. A. mollis, *Wall. Cat.* 4689, *in part.*

TEMPERATE AND ALPINE HIMALAYA, from Kashmir to Sikkim, alt. 9–15,000 ft.

Densely tufted, glabrate or softly hairy. *Rootstock* clothed with old leaf-sheaths. *Radical leaves* many, stalked, suborbicular, deeply cordate; *segments* broad, cuneate, variously cut and lobed, rarely shortly petiolate. *Scapes* 6–12 in., 1–3-flowered; invol. leaves 3-fid. *Flowers* white purplish or golden; pedicels long, slender. *Sepals* silky outside, generally lead-coloured near the claw. *Achenes* strigose, rarely glabrous.—Very variable in size, hairiness, and colour of flower; the most abnormal form is described as var. *glabra* in Fl. Ind. from W. Tibet (*Winterbottom*), it is quite glabrous with very many golden sepals.

8. **A. rupestris,** *Wall. Cat.* 4696; slightly hairy, rootstock stout fibrous, radical leaves 3-partite, segments narrow petioled,, invol. leaves small sessile free, scape 1–3-flowered. *H. f. & T. Fl. Ind.* 21.

ALPINE HIMALAYA, from Kashmir and Hazara to Sikkim; ascending to 15,000 ft., *Wallich*, &c.

Probably a state of *A. obtusiloba*, but smaller, more slender, less hairy, with narrower segments to the more cut leaves. The Sikkim specimens have more divided leaves and hooked glabrous achenes, but the latter are immature.—*Flower* golden yellow.

9. **A. trullifolia,** *H. f. & T. Fl. Ind.* 22; densely hairy, rootstock stout fibrous, radical leaves oval 3-lobed, invol. leaves small sessile free, scape 1–3-flowered.

ALPINE EASTERN HIMALAYA, Sikkim, alt. 11–15,000 ft., *Hooker f.*; Bhotan, *Griffith.*

Probably another form of *A. obtusiloba*, with more entire leaves, and more silky hairs, the flowers are golden yellow and achenes densely strigose.—Amongst Strachey's specimens of *A. obtusiloba*, are some with similarly entire leaves, but they are longer-petioled and less hairy than in *A. trullifolia.*

10. **A. rivularis,** *Ham. in DC. Syst.* i. 211 (*not of Wall. Cat.*); silky-pubescent, rootstock stout woody, radical leaves 3-partite, segments lobed and serrate, invol. leaves large free, cymes many-flowered. *Don Prodr.* i. 93; *H. f. & T. Fl. Ind.* 23. A. hispida, *Wall. Cat.* 4694. A. Wightiana, *Wall. Cat.* 4697; *W. & A. Prodr.* 3; *Wight Ic.* t. 936. A. dubia, *Wall. Cat.* 4698; *W. & A. Prodr.* 3; A. geraniifolia, *Wall. Cat.* 4693.

Temperate regions above 5000 ft. throughout INDIA, and CEYLON.

Stem 1–3 ft., branched. *Radical leaves* long-petioled, 3–6 in. diam.; segments cuneate at the base, broadly oval or trapezoid, deeply 3-lobed, lobes cut and serrate. *Cyme* compound; branches spreading, elongate, 2-bracteolate; invol. leaves large, 3-partite, ultimate segments linear-oblong, acutely inciso-serrate. *Flowers* 1–1½ in. diam., white or bluish outside. *Sepals* 5–8, silky outside. *Achenes* large, oblong; style hooked.—A monster with the inflorescence or leafy umbel often 6 in. diam., is common in the W. Himalaya.

SECT. IV. **Omalocarpus,** *DC. Achenes* with a short style, not imbedded in wool, much compressed, almost winged. (Flowers usually many in the umbels; pedicels not involucellate.)

* *Flowers in simple umbels (sometimes compound in* 12, polyanthes.)

11. **A. demissa,** *H. f. & T. Fl. Ind.* 23; softly hairy, leaves 3-partite, segments petiolate, scapes decumbent.

ALPINE EASTERN HIMALAYA; Sikkim, alt. 13–16,000 ft., *Hooker f.*

Rootstock woody, clothed with old leaf-sheaths. *Leaves* 1 in. diam., orbicular; segments cuneate-obovate, variously cut. *Scapes* 6–16 in., stout; invol. leaves small, 3-lobed. *Flowers* 3–6, 1 in. diam., bluish. *Achenes* very flat, orbicular, glabrous; style deflexed.

12. **A. polyanthes,** *Don Prodr.* 194; densely silky, leaves 5–7-lobed, scapes erect. *H. f. & T. Fl. Ind.* 24. A. longiscapa, *Wall. Cat.* 4691. A. scaposa, *Edgew. in Trans. Linn. Soc.* xx. 27. A. villosa, *Royle Ill.* 52. A. Govaniana, *Ib.* p. 45 (*not. Wall. & Don.*)

INNER HIMALAYA, alt. 10–12,000 ft.; from Kashmir to Sikkim, *Wallich*, &c.

Rootstock stout, woody. *Stem* 1–2 ft. *Leaves* long-petioled, 2–4 in. diam., reniform-cordate; lobes broad, cuneate, 3-fid and crenate. *Umbels* many-flowered, simple or with the side branches divided and involucellate; invol. leaves cuneate-oblong, variable, more or less cut. *Flowers* 1 in. diam., white. *Achenes* broadly oval, with a sharp straight beak.—Perhaps only a form of *A. narcissiflora*, with less cut leaves, more compound umbel, and differently shaped achenes.

13. **A. narcissiflora,** *L.; DC. Prodr.* i. 21; densely villous, leaves palmately 5-partite, segments deeply cut into linear lobes, scapes erect. *H. f. & T. Fl. Ind.* 24.

KASHMIR, *Falconer, Winterbottom.*—DISTRIB. Alps of S. and Central Europe, W. Asia, Siberia, N. W. America.

Very similar to and probably connected by intermediates with *A. polyanthes*, but smaller, 1 ft. high; leaves 1–2 in. diam.; flowers simply umbelled, and achenes nearly orbicular with an incurved beak.

** *Flowers in umbels or cymes* (*see* 12, polyanthes).

14. **A. tetrasepala,** *Royle Ill.* 53; glabrate, leaves deeply 5-lobed, achenes obovate-oblong with a hooked beak. *H. f. & T. Fl. Ind.* 24.

WESTERN HIMALAYA, Marri, Kashmir and Kishtwar, alt. 8–11,000 ft.

Rootstock woody, crown fibrous; buds, petioles, and young leaves woolly. *Radical leaves* 3–10 in. diam., long-petioled, coriaceous, reniform or cordate, deeply 5-lobed; segments acute, entire lobed or inciso-serrate. *Cyme* often thrice branched, contracted or effuse and 1 foot long; invol. leaves large, broadly cuneate, sharply toothed. *Flowers* white.—A large robust species allied to *A. polyanthes*.

15. **A. elongata,** *Don Prodr.* 194; pubescent, leaves 3-partite, achenes broadly oval with a short straight beak. *H. f. & T. Fl. Ind.* 25. A. rivularis, *Wall. Cat.* 4692 (*not of others*).

TEMPERATE HIMALAYA, Garwhal, alt. 10,000 ft., *Str. & Winterb.*; Nipal, *Wallich*; KHASIA HILLS, alt. 5000 ft., *H. f. & T.*

Rootstock small, fibrous. *Stem* 2–3 ft., slender, pubescent. *Radical leaves* 2–4 in. diam., long-petioled, orbicular, base cordate, with a few soft hairs chiefly below; lateral segments deeply 2-lobed, mid-segment 3-lobed; lobes acute, inciso-dentate. *Cymes* elongate, few-flowered, twice or thrice divided, fascicles 2–3-flowered. *Invol.* leaves oblong or broad-cuneate, variously toothed. *Flowers* white.—Remarkable for the elongate stems and scapes.

4. **THALICTRUM,** Linn.

Erect, usually rigid, perennial herbs. *Leaves* compound; petioles sheathing, often auricled or stipuled. *Flowers* panicled or racemed, often polygamous. *Sepals* 4–5, petaloid, imbricate. *Petals* 0. *Stamens* many. *Carpels* few or many; ovule 1, pendulous. *Fruit* a small head of sessile or stalked achenes; style persistent or deciduous.—DISTRIB. Temperate and cold northern regions, very rare in the S.; species 50.

SECT. I. **Physocarpum,** *DC.* *Achenes* stalked, laterally compressed, flat or inflated. *Leaves* ternately decompound, or in 6, *pauciflorum*, 2-ternately divided.

1. **T. elegans,** *Wall. Cat.* 4728; stem 8–12 in., leaves 2–3 in. glaucous beneath, flowers small, anthers short mucronate, achenes long-stalked ventral suture winged. *Royle Ill.* 51; *H. f. & T. Fl. Ind.* 13; *Edgew. in Trans. Linn. Soc.* xx. 26.

SUBALPINE HIMALAYA, from Hazara to Sikkim, alt. 10–13,000 ft.

Leaves decompound; leaflets small, suborbicular, 3-lobed or -partite; segments obovate. *Panicle* sparingly branched; branches almost racemose. *Flowers* very small, green-purple. *Filaments* filiform. *Achenes* 6–12, shorter than their stalks, obliquely obovate, membranous; stigma sublateral, incurved.

2. **T. platycarpum,** *H. f. & T. Fl. Ind.* 13; stem 8–18 in., leaves 2–3 in. glandular-puberulous beneath, flowers small, anthers long not pointed, achenes short-stalked strongly 3-ribbed on each side.

ALPINE HIMALAYA and WEST TIBET, rare; Nubra, *H. Strachey*; Hundes, *Str. & Wint.*; Badrinath and Chur in GARWHAL, *Falconer*.

Habit and appearance of *T. elegans*, but more wiry, branches of panicle longer and more leafy, and segments of leaves sharper. *Flowers* greenish. *Achenes* 4–10, glabrous, broadly obovate, dorsal suture nearly straight.—Probably an alpine state of *T. cultratum*.

3. **T. cultratum,** *Wall. Cat.* 3715; *Pl. As. Rar.* ii. 26; stem 2–4 ft., leaves large, flowers greenish-white, anthers with a long point, achenes short-stalked 3-ribbed on each side. T. Chelidonii β, *H. f. & T. Fl. Ind.* 13.

TEMPERATE HIMALAYA, from Kashmir to Sikkim, alt. 8–12,000 ft.

Glabrous, branched. *Leaf-sheaths* with small auricles; leaflets ¼–½ in., obovate-cuneate, membranous, glabrous or slightly pubescent below, obtusely 3-lobed, lobes mucronate, of the upper leaves acute. *Panicles* lax. *Sepals* ½ in. *Achenes* glabrous, ½-obovate, dorsal suture straight; style straight or hooked.

4. **T. Chelidonii,** *DC. Prodr.* i. 11; stem 2–8-flowered, leaves large, flowers large lilac or purple, anthers shortly mucronate, achenes long-stalked membranous reticulate, style incurved. T. Chelidonii γ cysticarpum, *H. f. & T. Fl. Ind.* 14. T. cysticarpum, *Wall. Cat.* 3714; *Pl. As. Rar.* ii. t. 129.

TEMPERATE HIMALAYA, alt. 8–12,000 ft.; from Kulu to Sikkim.

Usually much-branched. *Leaflets* of the lower leaves 1 in. diam., orbicular-cordate, 3–4-crenate or lobed, glabrous and pale beneath; floral leaflets sharply toothed. *Panicle* with long rigid branches; pedicels often 1 in., rigid, tips deflexed, especially in fruit. *Flowers* 1 in. diam. *Sepals* elliptic, obtuse. *Achenes* numerous, as long as their stalk.—Muricated bulbils often occur in the leaf axils; monstrous states have many or all the achenes enlarged and seedless.

5. **T. reniforme,** *Wall. Cat.* 3716; *Pl. As. Rar.* ii. 26; glandular when young, stem 3–6 ft., leaves large, flowers small greenish-white, anthers with a long point, achenes long-stalked puberulous 3-ribbed on each side, style straight. T. Chelidonii α reniforme, *H. f. & T. Fl. Ind.* 13. T. neurocarpum, *Royle Ill.* 51.

TEMPERATE HIMALAYA, from Kulu to Sikkim, alt. 8–10,000 ft.

Usually much branched. *Leaf-sheaths* expanding into adnate stipules; principal divisions with white deciduous stipellæ at the base; leaflets 1–1½ in. diam., orbicular-cordate, often slightly 3-lobed, pale and softly pubescent beneath, floral smaller and more sharply toothed. *Panicle* lax, decompound. *Flowers* smaller than in the two last, ⅓–½ in diam. *Sepals* very deciduous. *Achenes* 6–8, as long as their stalks, ½-obovate, dorsal suture straight.

6. **T. pauciflorum,** *Royle Ill.* 52; glabrous, stem 1–2 ft., leaves subsessile 2-ternate, flowers small, anthers shortly pointed, achenes short-stalked 3-nerved on each side, style straight. *H. f. & T. Fl. Ind.* 14. T. secundum *and* T. macrostigma, *Edgew. in Trans. Linn. Soc.* xx. 26.

WESTERN TEMPERATE HIMALAYA; from Kashmir to Kumaon, alt. 7–13,000 feet.

Stem branched. *Leaves* small, uniform in size all up the stem; leaflets obovate-cuneate, 3–4-lobed, reticulate, pale beneath, all petioled, mid-leaflets longest-petioled. *Panicle* with 1 or few flowers at the ends of long branches. *Sepals* 3-nerved, ovate, acute. *Achenes* 3–5, obovate, dorsal suture straight.

SECT. II. **Euthalictrum,** *DC.* *Achenes* not compressed, oval or oblong, sessile or stalked (see 11, *alpinum*, and 14, *Punduanum*).

* Achenes elongate, more or less stipitate. Anthers with a very short beak or 0.

7. **T. virgatum,** *H. f. & T. Fl. Ind.* 14; leaves subsessile simply ternate, flowers small white, achenes many small erect acute at each end ribbed, stigma straight.

EASTERN HIMALAYA, inner valleys of Sikkim, alt. 6–10,000 ft, *Hook. f.* BHOTAN *Griffith* (It. notes, 284).

Glabrous. *Stem* erect, 1–1½ ft. *Leaflets* ½–1 in., coriaceous, reticulate, orbicular, 5–7-lobed, base cuneate, glaucous beneath. *Panicle* decompound, spreading, bracts minute. *Anthers* not beaked. *Achenes* 10–25, very short-stalked.

8. **T. rutæfolium,** *H. f. & T. Fl. Ind.* 14; glabrous, weak, straggling, leaves decompoundly pinnate, flowers racemed very small greenish, achenes few many-ribbed oblong curved, style incurved.

WESTERN TIBET, alt. 10–14,000 ft., *Thomson;* interior of Sikkim, alt. 12,000 ft. *Hook. f.*

More or less glaucous. *Stem* 1–2 ft. *Leaf-sheath* auricled; divisions stipellate; leaflets very small, 3-lobed or -partite, base cuneate. *Panicle* with long rigid simple branches; pedicels spreading or deflexed. *Anthers* short; shortly beaked. *Achenes* shortly stipitate, abruptly deflexed, beaked by the style.—The Sikkim specimens are greener and more luxuriant than the Tibetan, and have longer achenes.

9. **T. pedunculatum,** *Edgew. in Trans. Linn. Soc.* xx. 27; leaves 3-ternate, flowers large white, achenes elongate strongly ribbed, style incurved. *H. f. & T. Fl. Ind.* 15; *Griff. Itin. not.* 348.

WESTERN TEMPERATE HIMALAYA; Simla to Kaffristan, alt. 6–8000 ft., *Edgeworth,* &c.

Glabrous. *Stem* 1–2 ft. *Leaves* long-petioled, primary and secondary divisions long-stalked; leaflets membranous, 1 in. diam., orbicular or cuneate-obovate, 3–7-lobed. *Panicle* terminal; pedicels long. *Sepals* variable in size, ½–1 in., oblong, obtuse, twice as long as the stamens. *Anthers* not pointed, short. *Achenes* ½–⅝ in., linear-oblong, tapering at both ends.—Griffith's Kaffristan specimens are larger flowered than the Himalayan.

10. **T. rostellatum,** *H. f. & T. Fl. Ind.* 15; diffusely branched, leaves ternately decompound, flowers small white, achenes tapering into a straight beak half their length, tip hooked.

TEMPERATE HIMALAYA, alt. 7–11,000 ft., rare, from Simla, *Jacquemont,* &c., to Sikkim, *Hook. f.*

** Achenes short, oblong, ribbed, subsessile (stalked in 11, *alpinum* and 14, *Punduanum*).

† *Leaves simple, once or twice ternate, or pinnate* (*rarely* 2-*pinnate*).

11. **T. alpinum,** *L.; DC. Prodr.* i. 12; small, slender, leaves all radical pinnate rarely 2-pinnate, flowers racemed, achenes oblong striate subsessile or stipitate. *H. f. & T. Fl. Ind.* 18. T. microphyllum *and* T. marginatum, *Royle Ill.* 51. T. acaule, *Camb. in Jacq. Voy. Bot.* t. i. A.

Alpine Himalaya *and* West Tibet, alt. 10–17,000 ft.—Distrib. North Alpine and Arctic regions.

A slender, tufted, glabrous perennial. *Stem* 3–6 in. *Leaflets* small, rounded, 3-lobed or almost 3-partite, glaucous beneath. *Scapes* simple, rarely forked; pedicels short, reflexed in fruit; bracteoles oblong, obtuse, membranous. *Flowers* greenish. *Anthers* beaked. *Achenes* few.—The length of the stalk of the achene varies in both European and Indian specimens.

12. **T. rotundifolium,** *DC. Syst.* i. 185; leaves simple, stipules free, filaments filiform, achenes with a straight beak hooked at the tip. *Don Prodr.* 193; *Wall. Cat.* 2713; *Pl. As. Rar.* t. 264; *H. f. & T. Fl. Ind.* 19.

Nipal, *Hamilton*, *Wallich.*

Stem erect, 1 ft.; roots fibrous. *Leaves* long-petioled, 2–3 in diam., orbicular or reniform, with many shallow toothed lobes, membranous, much reticulate, scabrous on both surfaces; stipules oblong. *Panicle* few-flowered. *Achenes* immature.

13. **T. Dalzellii,** *Hook. Ic. Pl.* t. 866; leaves 3-foliolate rarely 2-ternate, stipules free, panicle subsimple, filaments clavate, achenes with a long straight beak hooked at the tip. *H. f. & T. Fl. Ind.* 10; *Dalz. & Gibs. Bombay Flora*, 2.

Mountains of the Western Peninsula; Harrichander, *Dalzell;* Bababuden hills in Malabar, *Law.*

Stem erect, 1 ft. *Leaves* slightly sheathing at the base; leaflets 1½–2 in. diam., reniform, deeply cordate. 7–9 lobed, lobes crenate or toothed; stipules oblong. *Panicle* small, branches few. *Flowers* white, fascicled at the ends of the branches. *Achenes* many, sessile, ribbed.

14. **T. Punduanum,** *Wall. Cat.* 3712; *Pl. As. Rar.* ii. 26; leaves 2-ternate, sheaths auricled, panicle much branched, filaments filiform, achenes many small ribbed, beak long straight hooked at the tip. *H. f. & T. Fl. Ind.* 18.

Temperate Western Himalaya; wet rocks of Garwhal and Kumaon, alt. 4500–7000 ft. Khasia hills, rocks near Churra, alt. 3–4000 ft.

Stem 2 ft., erect. *Leaves* long-petioled, upper 3-foliolate; leaflets 1–2 in. diam., orbicular or oval, base cordate or truncate, 5-lobed, crenate, glaucous or tomentose beneath, lateral oblique; stipels 0. *Panicle* nearly leafless. *Flowers* white. *Achenes* sessile or stalked, beak nearly their own length.—Two well-marked varieties.

Var. 1. *glaucum;* leaves membranous, glabrous and glaucous beneath, achenes sessile glabrous.—W. Himalaya and Khasia.

Var. 2. *glandulosum;* leaves coriaceous viscidly pubescent beneath, achenes more or less stalked glandular-hairy.—Khasia, with the former.

†† *Leaves ternately or pinnately decompound.*

15. **T. saniculæforme,** *DC. Prodr.* i. 12; small, leaf subsolitary 3–4-ternate, stipules almost free, filaments filiform, anthers short mucronate, achenes many small ribbed with a long straight beak hooked at the tip. *H. f. & T. Fl. Ind.* 15. T. radiatum, *Royle Ill.* 52.

Temperate Himalaya; on wet rocks and tree trunks, from Simla and Kunawer to Sikkim (alt. 8000 ft.).

Erect, 6–12 in., wiry, glabrous; root fibrous. *Radical leaf* often equalling the panicle, long-petioled, stem leaves few; leaflets ½–1 in., orbicular or oval, base cuneate, membranous, glaucous beneath, 3-lobed or -partite, lobes rounded or mucronate. *Flowers* small, white. *Achenes* sessile, oblong, as long as their beak.—Omitted in Wallich's Catalogue, but distributed by him.

16. **T. Javanicum,** *Blume Bijd.* 2; tall, leaves ternately decompound, stipules adnate membranous fimbriate, filaments club-shaped, anthers not

pointed, achenes large strongly ribbed, beak short hooked. *Miquel Fl. Ned. Ind.* i. pt. 2, 5. T. glyphocarpum, *W. & A. Prod.* 2; *Wight Ic.* t. 48; *H. f. & T. Fl. Ind.* 16.

TEMPERATE HIMALAYA, from Simla to Sikkim, alt. 6–12,000 ft. KHASIA hills, alt. 5-6000 ft.; Parusnath in BEHAR, alt. 4000 ft.; mountains of the WESTERN PENINSULA and CEYLON.—DISTRIB. Java.

Stem 2–3 ft., erect, glabrous; roots fibrous. *Leaves* without stipels; leaflets membranous, ¼–¾ in. diam., membranous, orbicular or oval, obtusely 3–7-toothed at the tip, base rounded or cordate, more or less glaucous beneath. *Panicle* branched. *Flowers* often clustered at the ends of the branches, small, white. *Achenes* 8–15, large, oblong.

17. **T. foliolosum,** *DC. Syst.* i. 175; tall, leaves pinnately decompound, sheaths auricled, filaments filiform, anthers beaked, achenes few acute at both ends sharply ribbed. *Don Prodr.* 192; *Wall. Cat.* 3711; *Royle Ill.* 51; *H. f. & T. Fl. Ind.* 16.

TEMPERATE HIMALAYA, alt. 5–8000 ft. KHASIA HILLS, alt. 4–6000 ft.

Stem 4–8 ft., glabrous. *Leaves* very much divided, without stipels; leaflets ⅙–¼ in., rarely 1 in., orbicular. *Panicle* much branched; bracts small. *Flowers* polygamous, white pale green or dingy purple. *Achenes* usually 2–5, small, oblong.

18. **T. minus,** *L.*; *DC. Prodr.* i. 13; tall, leaves decompoundly pinnate exstipulate, filaments filiform, anthers elongate apiculate, achenes tapering at both ends ribbed tipped by the oblong oblique style. *H. f. & T. Fl. Ind.* 16.

Inner valleys of the TEMPERATE HIMALAYA, and in WEST TIBET, alt. 9–12,000 ft. —DISTRIB. Europe, N. Asia, Abyssinia, S. Africa.

Stem 2–4 ft., erect. *Leaves* sheathing, principal divisions with or without stipels: leaflets very variable, orbicular oval or oblong, 3-lobed; lobes crenate or toothed. *Panicle* much branched, leafless or nearly so. *Flowers* dingy purple. *Achenes* 5–8, oblong.—We have again compared extensive suites of European, N. Asiatic, and Indian specimens, with the aid of Regel's monograph, and find no reason for modifying the views expressed in Flora Indica, that all our Indian forms are referable to one species which is very variable in foliage, but constant in flowers.—The most prominent Indian varieties are :—

VAR. 1. *vulgare;* glabrous, leaflets small ¼–½ in. T. minus, *Boiss. Fl. Orient.* i. 8.—The common European form, less common in Tibet than the following.

VAR. 2. *fœtidum* (*sp. L.*); glandular-pubescent especially on the leaves beneath, leaflets as in *vulgare.* T. minus β. glandulosum, *Koch.* T. vaginatum, *Royle Ill.* 52.

VAR. 3. *majus* (*sp. Jacq.*); glabrous, often glaucous; leaflets 1 in., achenes rather shorter and broader than in the common form. T. Kemense, *Fries.* T. Maxwellii, *Royle Ill.* 52.—Kunawer, *Royle, &c.* Kaffristan, *Griffith.*—Indian specimens have acutely 3-lobed leaflets, exactly agreeing with *T. Kemense,* Fr. In foliage it often closely resembles *T. flavum.*

5. **CALLIANTHEMUM,** C. A. Meyer.

A stemless perennial. *Leaves* all radical, 2-pinnate or decompound. *Scapes* 1-flowered. *Sepals* 5, deciduous. *Petals* 5–15, with a nectariferous pit on the claw. *Stamens* numerous. *Carpels* many; style short; ovule 1, pendulous. *Fruit* of many subglobose achenes tipped by the short style.—DISTRIB. Two species, a European and Siberian, and the following :—

1. **C. cachemirianum,** *Camb. in Jacq. Voy. Bot.* 5, t. 3. C. pimpinelloides, *H. f. & T. Fl. Ind.* 26. Ranunculus pimpinelloides, *Don in Royle Ill.* 53.

INNER RANGES OF THE HIMALAYAS, alt. 9–13,000 ft., from Kashmir, *Jacquemont*, to Sikkim, *Hook. f.*

Densely tufted, glabrous, glaucous; root fibrous. *Leaves* very numerous, long-petioled, segments rounded, 2–3-sect; pinnules orbicular, deeply cut. *Scapes* 2–4 in., shorter than the leaves. *Flowers* 1–1½ in. diam., white. *Sepals* broadly elliptic. *Petals* 8–12, 3 times larger than the sepals, oblong-cuneate, retuse. *Achenes* few, large, ovoid, obtuse, rugose.

6. **ADONIS,** Linn.

Annual or perennial herbs. *Leaves* much divided. *Sepals* 5–8, petaloid, coloured, imbricate. *Petals* 5–16, yellow or red, eglandular. *Carpels* many; style short; ovule 1, pendulous. *Fruit* a spike or head of many achenes tipped with a short persistent style.—DISTRIB. 3 or 4 European and Asiatic species.

SECT. I. **Adonia,** *DC.* Annual erect herbs, with leafy stems and scarlet flowers.

1. **A. æstivalis,** *L.; DC. Prodr.* i. 24; petals spreading, achenes angular, with a tooth on the inner angle near the beak. *W. & A. Prodr.* i. 3; *H. f. & T. Fl. Ind.* 25. A. Inglisii, *Royle Ill.* 53.

WESTERN HIMALAYA, in cornfields, from Kumaon to Kashmir, Hazara, and Peshawur.—DISTRIB. Temperate Europe and Asia.

An erect annual, 1–2 ft., simple or branched, nearly glabrous. *Leaves* decompoundly-pinnate, segments filiform. *Flowers* solitary at the ends of the branches, variable in size, scarlet with a dark purple eye. *Achenes* in an ovoid or oblong head, deeply pitted.—Differs from *A. autumnalis* in the spreading petals, but there are many intermediates. The achenes afford a very variable character, too much used in dividing varieties of this into species.

2. **A. scrobiculata,** *Boiss.; Fl. Orient.* i. 17 petals spreading, achenes angular surrounded near the broad base by a flattened almost winged collar.

WEST HIMALAYA, Kishtwar, *Stewart.*—DISTRIB. Affghanistan.

Doubtfully distinct from *A. æstivalis*, and only by the achenes which are more sharply angled, less pitted, and rough with small tubercles; the upper achenes seem to lose the basal wing. *A. marginata*, Bienert in Herb. Bunge, seems to be the same plant.

SECT. II. **Consoligo.** Perennial herbs, with golden yellow flowers.

3. **A. chrysocyathus,** *H. f. & T.;* petals at length spreading, achenes not angular turgid, style tapering revolute. A. pyrenaica, *H. f. & T. Fl. Ind.* 26 (not of DC.). CHRYSOCYATHUS (gen.), *Falconer in Royle Ill.* introd. xxx.

WESTERN ALPINE HIMALAYA, in Chamba and Kashmir, *Jacquemont;* WESTERN TIBET in Deotsu and Guge, *Strachey & Winterb.*

Rootstock scaly, horizontal. *Stems* several, erect, leafy, flowering 6–9 in., fruiting 15 in. *Radical leaves* petioled, 3–6 in., deltoid, pinnately decompound, segments narrow-linear or subcuneate. *Flowers* golden-yellow, 2 in. and more diam., buds globose. *Sepals* 7–8, obovate, acute, many-nerved. *Petals* 16–24, twice as long as the sepals, narrow-obovate, obtuse. *Achenes* in a dense head, ⅔ in. diam., glabrous, flattened anteriorly, dorsally convex and obtusely keeled.—The foliage and flowers closely resemble those of *A. pyrenaica*, to which in the absence of fruits we formerly referred it, and from which it differs in the numerous much smaller achenes.

7. RANUNCULUS, Linn.

Annual or perennial herbs. Leaves entire lobed or dissected. *Stipules* membranous or 0. *Flowers* usually panicled, white or yellow. *Sepals* 3–5, caducous, imbricate in bud. *Petals* usually 5, rarely 0, often glandular near the base. *Stamens* many. *Carpels* many; styles short; ovule 1 ascending. *Fruit* a head or spike of beaked or apiculate achenes.—DISTRIB. All temperate and cold regions; species about 160.

SECT. I. **Batrachium.** Water plants. *Flowers* white. *Achenes* transversely wrinkled, sometimes obscurely.

1. **R. aquatilis,** *L.;* var. *trichophyllus;* leaves all submerged capillaceo-multifid, stipules ½-adnate, auricles large, flowers small, stamens few. R. aquatilis, *Don in Royle Ill.* 54; *H. f. & T. Fl. Ind.* 29.

WEST HIMALAYA, from Kumaon to the Indus. EAST AND WEST TIBET. Plains of the PUNJAB, as far south as Delhi and Saharunpore.—DISTRIB. Temperate N. and S. hemispheres.

The Indian forms have been identified by Mr. Baker with *trichophyllus*, and its subvarieties *Drouetii* and *pantothrix*. Large flowered specimens from Hanle in Tibet differ from true *aquatilis* chiefly in the absence of floating leaves. A small greener terrestrial variety grows in the Punjab. Floating leaves are invariably absent in the Indian plant.

SECT. II. **Ceratocephalus,** *Mœnch* (genus). Annual herbs. *Flowers* yellow. *Achenes* gibbous at the sides, with a long terminal beak.

2. **R. falcatus,** L.; leaves 3-fid or pinnatifid, scapes longer than the leaves 1-flowered. Ceratocephalus falcatus, *Pers.; H. f. & T. Fl. Ind.* 28. C. orthoceras, *DC.; Deless. Ic. sel.* i. t. 23. Anemone cynosurus, *Griff. Ic. Pl.* iv. t. 660, f. 1.

TEMPERATE HIMALAYA, from Kishtwar westwards. PUNJAB, dry grassy places at Peshawur, *Stewart.*—DISTRIB. S. E. Europe and W. Asia.

Glabrous or a little woolly. *Leaves* all radical, segments narrow-linear, entire or 3-fid; petiole margined, tapering downwards. *Scapes* 1 or more, 1–3 in., longer than the leaves. *Flowers* small. *Stamens* 5–15. *Achenes* with the beak straight or curved.—A very variable little plant, of which 7 or 8 species have been made; Boissier reduces them to 2, a hooked and straight beaked, having never seen immediates, of which we have seen many.

SECT. III. **Hecatonia,** *DC.* Perennial, rarely annual. *Flowers* yellow (in the Indian species). *Achenes* smooth or granular, not muricated or tubercled, shortly beaked.

* Radical or all the leaves undivided (except sometimes in 7, *pulchellus*).

3. **R. Lingua,** L.; tall, erect, glabrous, leaves lanceolate, flowers large, petals 5. *DC. Prodr.* i. 32; *H. f. & T. Fl. Ind.* 30.

WEST HIMALAYA; Kashmir Lake, *Jacquemont,* &c.—DISTRIB. Temperate N. hemisphere.

Rootstock creeping. *Stem* 2–3 ft., hollow. *Leaves* 4–8 in., sessile, ½-amplexicaul, entire or remotely toothed, veins parallel, venules reticulate. *Flowers* subpanicled. *Achenes* pitted; beak broad, flat.

4. **R. reniformis,** *Wall. Cat.* 4709; erect, stem softly hairy, leaves broadly oval or orbicular coarsely toothed, petals 12–15. *W. & A. Prodr.* 3; *Wight Ill.* i. t. 2; *Ic.* t. 75; *H. f. & T. Fl. Ind.* 30.

Higher mountains of the Western Peninsula, *Wight*, &c.

Rootstock stout, horizontal, densely fibrous. *Stem* 1–1½ ft.; branches few, 1-flowered. *Radical leaves* 1–3 in., thick, base truncate or cordate, glabrate or sparsely setose; cauline few, narrow, bracteiform. *Flowers* 1 in. diam. *Petals* obovate oblong. *Achenes* oblong, tumid, in a globose head; beak straight.

5. **R. sagittifolius,** *Hook. Ic. Pl.* t. 173; erect, glabrous above, leaves oblong-cordate or sagittate crenate, petals 5. *H. f. & T. Fl. Ind.* 30. R. hastatus, *Walker mss. ex Wight Ill.* i. 5.

Mountains of Ceylon, above 6000 ft., *Walker*, &c.

Rootstock creeping. *Stem* erect, with scattered hairs near the base. *Radical leaves* long-petioled, base deeply cordate with rounded lobes; cauline narrow-lanceolate, inciso-dentate or almost pinnatifid. *Petals* nearly orbicular. *Achenes* as in *R. reniformis*.—Distinguished from *R. reniformis* chiefly by the few petals; the leaves are very variable in both. *R. javanicus*, Bl., is closely allied, but quite glabrous.

6. **R. Cymbalariæ,** *Pursh. Fl. Bor. Am.* ii. 392; creeping, glabrous, leaves oblong or orbicular 3–5-lobed, or -partite, petals 5–8. *H. f. & T. Fl. Ind.* 31.

West Tibet, between 7000 and 17,000 ft., *Thomson*. Interior of Sikkim, alt. 14,000 ft., *Hook. f.*—Distrib. Persia, Siberia, Arctic and cold temperate N. America, Cordillera of N. and S. America.

Rootstock with long rooting runners; stem 0. *Leaves* ¼–½ in. diam., base rounded or slightly cordate. *Scape* erect, leafless, 1–8-flowered; bracts at the forks, linear. *Flowers* ¼–½ in. diam. *Sepals* spreading or reflexed. *Achenes* many, small, obovate, compressed, gibbous at the back, sides longitudinally 3-ribbed; beak straight or hooked. —Variable in foliage and form of heads of fruit, and stolons sometimes absent.

7. **R. pulchellus,** *C. A. Mey. in Led. Fl. Alt.* ii. 333; erect, glabrous hairy or silky, leaves elliptic-oblong entire or 3–7-toothed or lobed, petals 5. *H. f. & T. Fl. Ind.* 31. R. salsuginosus, *Wall. Cat.* 4708 (*not of Don*); R. Flammula, *Don in Royle Ill.* 53 (*not of Linn.*); R. nephelegenes, *Edgew. in Trans. Linn. Soc.* xx. 28.

Alpine Himalaya, in the inner ranges from Sikkim westward, and in Western Tibet, from 10–18,000 ft.—Distrib. Affghanistan, Siberia, Mongolia.

Stem 3–12 in., simple or with a few 1-flowered branches. *Leaves* glabrous or pubescent, sometimes palmately lobed; cauline lanceolate, often entire. *Flowers* ½ in diam. *Sepals* elliptic, often black-tipped. *Petals* broadly obovate. *Achenes* in an oblong head, small, inflated, glabrous; style nearly straight.—Common and very variable, states with broad deeply cut leaves pass into glabrous achened states of *R. pedatifidus*. The *R. longicaulis*, C. A. Meyer, is another variety.

Var. 1. *typicus;* leaves glabrous or slightly pubescent.

Var. 2. *sericeus;* leaves densely silky. R. membranaceus, *Royle Ill.* 53.

8. **R. lobatus,** *Jacq. ex Camb. in Jacq. Voy. Bot.* 5, t. i. B; decumbent, glabrous, leaves orbicular crenate coriaceous, petals 5. *H. f. & T. Fl. Ind.* 31. R. salsuginosus, *Don in Royle Ill.* 53 (*not of Wall. Cat.*).

Alpine Himalaya, in the inner ranges, alt. 12–16,000 ft. from Zanskar to Sikkim, and in West Tibet, *Jacquemont*, &c.

Rootstock giving off weak decumbent leafy stems 2–3 in., not stoloniferous. *Radical leaves* ½–1 in. diam., long-petioled, rounded or cordate at the base; cauline similar but shorter-petioled, often 3-toothed. *Flowers* ⅔–¾ in. diam. *Sepals* oval. *Petals* broadly obovate. *Achenes* in an oval head, slightly compressed, beaked by the long straight style.—Distinguished from *R. pulchellus* by the diffuse stem, large fleshy cauline leaves and large flower, but intermediates occur.

** Leaves lobed or much divided. Achenes turgid, not margined, compressed in 10, *Chærophyllos* (see 7, *pulchellus*).

9. **R. hyperboreus,** *Rotlb.*; stem creeping stoloniferous, leaves 3–7-lobed or capillaceo-multifid, flowers small solitary, petals scarcely exceeding the sepals.

Inner regions of the ALPINE HIMALAYA, from Sikkim to Kashmir, and in WESTERN TIBET, alt. 14–17,000 ft.—DISTRIB. Arctic and Alpine Northern regions.

A small glabrous perennial, terrestrial or floating. *Leaves* orbicular or reniform, base sometimes cuneate, lobed to the middle or base. *Sepals* reflexed. *Petals* obovate. *Achenes* in dense heads, very small, oval, beaked by the short style.—Minute specimens without stolons are undistinguishable from *R. pygmæus*, Vahl.

VAR. 1. *typicus;* creeping on moist ground, leaves very small 3-lobed to about the middle, base rounded or cuneate, head of achenes small. R. hyperboreus, *H. f. & T. Fl. Ind.* 32.

VAR. 2. *natans*, Regel; floating, leaves ½–1 in. diam. reniform 5–7-lobed, heads of achenes large. R. natans, *C. A. Meyer;* R. radicans. *H. f. & T Fl. Ind.* 32 (*in part*).

VAR. 3. *radicans;* creeping in moist soil, leaves rounded or reniform 5–7-partite, heads of fruit large. R. radicans, *C. A Meyer; H. f. & T. Fl. Ind.* 32 *in part;* R. radicans α typicus, *Regel.*

VAR. 4. *multifidus;* floating, leaves capillaceo-multifid like *R. aquatilis.* R. Purshii, *Hook. Fl. Bor. Am.* R. radicans γ multifidus, *Regel*—Ladak, *Stewart.*

10. **R. Chærophyllos,** *Linn.*; erect, pubescent or villous, leaves ternately partite rarely entire, achenes compressed in an oblong head, beak long straight. *H. f. & T. Fl. Ind.* 33.

WESTERN TIBET, mountains of Hasora, alt. 12,000 ft., *Winterbottom.*—DISTRIB. S. Europe, Asia Minor, Persia.

Rootstock tuberous, with thick fibres. *Stem* 6–12 in, simple or with 2–4 long 1-flowered branches. *Radical leaves* rarely oval and entire, usually with 3-partite or variously-cut segments, cauline few 3-partite or linear and entire. *Flowers* 1 in. diam. *Sepals* spreading. *Achenes* many, oval.

11. **R. affinis,** *Br.*; erect or diffuse, hairy, leaves pedately 5–9-lobed, achenes in oblong heads inflated, beak straight. R. cæspitosus, *Wall. Cat.* 4701. *H. f. & T. Fl. Ind.* 33. R. pedatifidus, *Led.* (*not Smith*). R. dahuricus, *Turcz.*

Inner ranges of the TEMPERATE and ALPINE HIMALAYA, from Sikkim to Balti, alt. 11–16,000 ft.; and in WESTERN TIBET.—DISTRIB. Temperate and Arctic Asia and America.

Stems 6–12 in., often many, from a perennial, slender, branched rootstock. *Radical leaves* reniform, ½–1 in. diam., lobed to the middle or base, lobes oblong or linear; lower cauline with narrower segments, upper entire or 3–5-partite. *Flowers* ⅓–⅔ in. diam. *Sepals* silky. *Achenes* small, scarcely compressed.—Hardly different from the Siberian *R. amœnus*, Led. (*R. pedatifidus*, Sm.)

12. **R. hirtellus,** *Royle Ill.* 53; erect or decumbent, pubescent, leaves 3-partite, achenes in an oblong or globose head inflated, style straight or hooked. *H. f. & T. Fl. Ind.* 34. R. attenuatus, nervosus, choorensis, *and* glabratus, *Royle Ill.* 53.

TEMPERATE and SUBALPINE WESTERN HIMALAYA, ascending to 14,000 ft. (a dwarf large flowered state).

Rootstock densely fibrous. *Stems* many, 1–1½ ft., branched, many-flowered (except the alpine forms). *Radical leaves* 1½–2 in. diam., reniform, lateral segments often deeply 2-lobed; cauline palmately 3–5-partite. *Flowers* ⅓–⅔ in. diam. *Sepals* with appressed hairs. *Achenes* many, glabrous or hairy.—Very variable, and closely allied to the European *R. auricomus*, but the achenes are smaller, less compressed, are in an oval head, and the radical leaf appears never to be entire.

13. **R. nivalis,** *Linn.;* small, erect, 1-flowered, shaggy above, leaves 3–5-lobed or -partite, sepals shaggy. *H. f. & T. Fl. Ind.* 35.

ALPINE HIMALAYA. Tunkra pass in Sikkim, alt. 16,000 ft., *Hook. f.*—DISTRIB. Arctic Europe, Asia, and America.

Rootstock small. *Stems* subsolitary, 1–3 in., glabrous below. *Radical leaves* glabrous, segments 3-lobed: lower cauline petioled, upper sessile.—Apparently the same as the arctic plant, but not found in fruit.

14. **R. sceleratus,** *Linn.;* annual, erect, glabrous, leaves 3-partite, achenes many in an oblong head small obtuse or apiculate. *Don Prodr.* 195; *Royle Ill.* 53; *H. f. & T. Fl. Ind.* 35. R. indicus, *Roxb. Fl. Ind.* ii. 657; *Wall. Cat.* 4699.

River banks in BENGAL and NORTHERN INDIA; marshes of Peshawer; warm valleys of the HIMALAYA (unknown south of the Nerbudda).—DISTRIB. throughout the North temperate zone.

Stem 1–3 ft., often stout, fleshy and branched, rarely puberulous above. *Leaves* with cuneate cut segments, cauline sessile. *Flowers* ¼–⅓ in. diam. *Sepals* reflexed, nearly equalling the oblong petals. *Receptacle* oblong, hairy.

*** Leaves deeply divided. *Achenes* flattened, with an intramarginal rib. (See 20, *muricatus.*)

15. **R. diffusus,** *DC.;* diffuse or prostrate, hairy, leaves 3-partite, achenes in globose heads dotted, receptacle of fruit small. *Don Prodr.* 195; *H. f. & T. Fl. Ind.* 36. R. napaulensis, *DC. Prodr.* i. 39. R. trilobatus, *Don Prodr.* 194. R. geranioides, *Blume Bijdr.* 2. R. hydrocotyloides, *Wall. Cat.* 4703; R. mollis, *Wall. Cat.* 4704; *Don in Royle Ill.* 53. R. obtectus. *Wall. Cat.* 4705. R. vitifolius, *Royle Ill.* 53. R. subpinnatus, *W. & A. Prodr.* 4; *Wight Ic.* t. 49; *H. f. & T. Fl. Ind.* 36.

TEMPERATE HIMALAYA, from the Chenab to Bhotan, alt. 6–10,000 ft. Higher mountains of the WESTERN PENINSULA.—DISTRIB. Sumatra, Java.

Perennial, covered with spreading hairs; nodes at times rooting. *Leaves* softly hairy, segments cuneate, of lower leaves often stalked. *Peduncles* 1-flowered, terminal or leaf-opposed. *Flowers* ½–1 in. diam. *Sepals* hairy. *Achenes* ovate, compressed, with an intramarginal rib at a variable distance from the acute margin; style short, straight or hooked.—Peninsula specimens have usually larger flowers and more divided leaves.—Near *R. repens*, L.

16. **R. lætus,** *Wall. Cat.* 4702; erect, appressedly hairy, leaves 3-partite, achenes in a globose head not dotted, receptacle of fruit oblong glabrous. *H. f. & T. Fl. Ind.* 36 (*excl. Syn.* R. riparius, *Edgew.*); *Royle Ill.* 53. R. distans, *Royle Ill.* 53; R. brevirostris, *Edgew. in Trans. Linn. Soc.* xx. 28.

TEMPERATE HIMALAYA and WESTERN TIBET. Common on the inner ranges only of SIKKIM.—DISTRIB. Affghanistan.

Rootstock woody. *Stem* 1–2 ft., usually much branched, many-flowered; hairs white. *Radical leaves* 2–4 in. diam.; segments cuneate-obovate, deeply cut; cauline sessile. *Flowers* 1 in. diam. *Sepals* villous. *Achenes* many, oval, margined, rather large; style short, straight, broad at the base.—Closely allied to and perhaps a var. of *R. acris*, L.

17. **R. pensylvanicus,** *Linn.;* erect, hirsute, leaves ternatisect, achenes in oblong or globose heads, not dotted, receptacle pilose. R. fibrosus, *Wall. Cat.* 4706; *Hook. f. & T. Fl. Ind.* 37. R. chinensis, *Bunge; H. f. & T. Fl. Ind.* 38. R. riparius, *Edgew. in Trans. Linn. Soc.* xx. 28. Ranunculi, sp. *Griff. Ic. Pl.* iv. t. 661.

Swamps and rice fields in NIPAL, *Wallich;* banks of the SUTLEJ at Ludiana, and GANGES at Bhojpur, *Edgeworth.* ASSAM, and KHASIA HILLS, up to 6000 ft., *H. f. & T.*—DISTRIB. N China, Amur-land, N. America.

Stem 2–3 ft., prostrate and rooting at the base only, branched. *Radical leaves* long-petioled, leaflets long-stalked, 3-partite and deeply cut into linear segments; cauline shorter petioled, upper subsessile. *Flowers* about 1 in. diam. *Sepals* reflexed. *Achenes* many, large, with an intramarginal rib and short straight beak.—Very variable in the shape of the head of achenes, and in the prominence and position of their intramarginal rib; but a large suite of specimens convinces us of the specific identity of all the forms.

SECT. IV. **Echinella,** *DC.* Annual, rarely perennial. *Flowers* small, yellow. *Achenes* echinate or tubercled (rarely smooth in 20, *muricatus*).

18. **R. flaccidus,** *H. f. & T. Fl. Ind.* 38; perennial, tufted, prostrate, leaves reniform or orbicular crenate glabrous, achenes beaked, rough with small tubercles.

TEMPERATE HIMALAYA, in the upper forest region, from Kumaon to Bhotan, alt. 9–10,000 ft.

Patches large, dense, green, appressed to the ground; stems filiform; nodes often rooting. *Leaves* ¼ in. diam. or less, 3–5-crenate. *Flowers* minute, ⅜ in. diam., solitary, leaf-opposed. *Sepals* reflexed, nearly equalling the petals. *Achenes* 6–12, pubescent, oval, not much compressed, beak short reflexed.

19. **R. Wallichianus,** *W. & A. Prodr.* i. 4; perennial, prostrate, hairy, leaves ternatipartite, achenes compressed orbicular tubercled.—*Wight Ic.* t. 937; *H. f. & T. Fl. Ind.* 38. R. pinnatus, *Wight Ill.* i. 6, *not of Poiret.*

Temperate zone of the mountains of CEYLON and NILGHIRI.

Stems spreading and rooting at the nodes from the perennial rootstock, hirsute, rarely glabrate. *Radical leaves* 1–1½ in. diam.; segments stalked, obovate-cuneate, sharply cut and toothed; cauline 3-partite. *Peduncles* 1-flowered, leaf-opposed and terminal. *Flowers* ⅓ in. diam. *Sepals* reflexed, much shorter than the petals. *Achenes* flattened, margined, both dotted and tubercled.

20. **R. muricatus,** *Linn.*; annual, erect or diffuse, glabrous, rarely hairy, leaves 3-fid, achenes oval flattened tubercled or spinous, rarely smooth. *H. f. & T. Fl. Ind.* 39. R. Cabulicus, *Boiss. Diagn. Ser.* 2, 9.

Swampy places, at low elevations, in the PUNJAB-HIMALAYA, and in the plains at PESHAWUR and AMBALLAH.—DISTRIB. Europe, W. Asia, temperate N. America.

Stems 4–12 in. *Leaves* 1–2 in. diam., lobes irregularly cut, base rounded or cordate, of the upper cuneate. *Flowers* ⅓–½ in. diam., solitary and leaf-opposed, or terminal and panicled. *Sepals* reflexed, rather shorter than the petals. *Achenes* in a large globose head, ⅓ in. long, tubercles scattered over the flattened sides, or confined to near the intramarginal rib; beak straight, compressed, ribbed, tip hooked.

21. **R. arvensis,** *Linn.;* annual, erect, much branched, glabrous or silky above, radical leaves cuneate or obovate 3–5-toothed, cauline 3-partite, achenes few large obliquely obovate not margined, densely spinous. *Wall. Cat.* 4700; *Royle Ill.* 53; *H. f. & T. Fl. Ind.* 39. R. tuberculatus, *DC. Prodr.* i 41.

WESTERN HIMALAYA, from Kashmir to Kumaon.—DISTRIB. Europe, Asia Minor, Affghanistan, Western Siberia.

Stem solitary, 6–24 in. *Leaves* variable, lowest 1–2 in., soon withering, segments of cauline cut into linear lobes. *Flowers* ½ in. diam. *Sepals* appressed to and half the length of the petals. *Achenes* 5–10, usually clothed with hooked spines; style straight or hooked.

Doubtful and excluded Species.

R. vestitus, Wall. Cat. 4707. The specimens consist of a few long-petioled radical leaves.

R. bulbosus, L. (*H. f. & T. Fl. Ind.* 37). Probably intercalated by mistake amongst Royle's Indian Plants. It has been found by no one else.

8. OXYGRAPHIS, Bunge.

Dwarf perennial glabrous stemless plants, with 1-flowered scapes. *Leaves* entire. *Flowers* regular, yellow. *Sepals* 5, persistent, enlarged after flowering. *Petals* 10-15, with a nectariferous pit on the claw. *Stamens* many. *Achenes* many, membranous, in a globose head, beaked by the straight subulate persistent style. *Seed* erect.—A genus of 2 species, differing from *Ranunculus* in the persistent sepals.

1. **O. glacialis,** *Bunge En. Pl. Alt.* 35; leaves elliptic-oblong, scape solitary. *H. f. & T. Fl. Ind.* 27. Ficaria glacialis, *Fisch.*

Alpine Himalaya: Kumaon, *Strachey & Winterb.*; Sikkim, alt. 16–18,000 ft., *Hook. f.*—Distrib. Siberia, Dahuria.

Root fibrous. *Leaves* ½–1½ in., somewhat fleshy, obtuse, entire or crenate; petiole as long, sheathing at the base. *Scape* erect, 1–4 in., thickened upwards. *Flowers* ¾ in. diam. *Sepals* elliptic, obtuse. *Petals* 12–15, narrow-oblong, twice as long as the sepals.

2. **O. polypetala,** *H. f. & T. Fl. Ind* 27; leaves orbicular crenate-lobed, scapes usually several. Ranunculus polypetalus, *Royle Ill.* 54, t. 11, f. 2. Callianthemum Endlicheri, *Walp. Rep.* i. 33.

Inner Alpine and Tibetan Himalaya, from Kashmir to Kumaon, alt. 12–15,000 ft.

Small, tufted; roots fibrous. *Leaves* ⅓–2 in. diam., membranous, base cordate, sometimes with 3 crenate lobes. *Scapes* 2–4 in., weak. *Flowers* 1 in. diam. *Petals* oblong-spathulate. *Achenes* as in *O. glacialis.*

9. CALTHA, Linn.

Herbs with stout creeping rootstocks. *Leaves* chiefly radical, ovate or cordate. *Flowers* few, terminal, regular, white or yellow. *Sepals* 5 or more, petaloid, deciduous, imbricate. *Petals* 0. *Stamens* many. *Carpels* several, sessile. *Follicles* many, many-seeded. *Seeds* many, 2-seriate, with a prominent raphe and thick funicle.—Distrib. N. and S. temp. regions; sp. 5–6.

1. **C. palustris,** *Linn.*; stem branched leafy, leaves reniform or deltoid with spreading lobes. *H. f. & T. Fl. Ind.* 40. C. Himalensis, *Don Prodr.* 195; *Royle Ill.* 54. C. Govaniana, *Wall. Cat.* 4710; *Royle Ill.* 54. C. paniculata, *Wall. Cat.* 4711.

Marshes of the Western Temperate Himalaya, from Kashmir to Nipal; alt. 8–10,000 ft.—Distrib. Temperate Europe, Asia, and N. America.

Rootstock stout, densely fibrous. *Stem* stout, 6–24 in. *Radical* leaves long-petioled, 2–5 in. diam., entire or finely or coarsely toothed; upper sessile. *Flowers* 1–2 in. diam. *Follicles* variable in number and length of style.—The leaves are never quite entire in Indian specimens, and are often more closely- and smaller-toothed than in European.

Var. 1. *normalis*; flower yellow.

Var. 2. *alba*; flowers white.—C. alba, *Jacq. ex Camb. in Jacq. Voy. Bot.* vi. t. 4.

2. **C. scaposa,** *H. f. & T. Fl. Ind.* 40; leaves all radical oval, scapes many 1-flowered.

EASTERN ALPINE HIMALAYA, Sikkim in marshes, alt. 15–17,000 ft., *Hook. f.*
Rootstock densely fibrous. *Leaves* all radical, 1–1½ in. diam., long-petioled, obtuse, base deeply cordate, entire or finely repand-crenate. *Scapes* many, 3–6 in. *Flowers* 1 in. diam. *Sepals* 5–6, oval, somewhat persistent. *Follicles* many, stalked.

10. CALATHODES, H. f. & T.

A perennial, erect, leafy herb. *Leaves* palmatipartite. *Flowers* terminal, regular, large. *Sepals* 5, golden-yellow, deciduous. *Petals* 0. *Carpels* many; ovules 8–10, 2-seriate towards the base of the carpel. *Fruit* unknown.—Intermediate between *Caltha* and *Trollius*, having the apetalous flowers of the former, and divided leaves of the latter.

1. **C. palmata,** *H. f. & T. Fl. Ind.* 41.

EASTERN TEMPERATE HIMALAYA, Sikkim, alt. 10,000 ft., *Hook. f.*
Stem 1–2 ft., simple or branched. *Leaves* 2–4 in. diam., radical soon withering; cauline 3-partite, segments cuneate at the base, deeply 3-lobed, lobes acuminate inciso-serrate, petiole with a basal inflated membranous sheath. *Flowers* nearly 2 in. diam.

11. TROLLIUS, Linn.

Erect, perennial herbs. *Leaves* palmate. *Flowers* terminal, regular, globose or subglobose. *Sepals* 5 or more, petaloid, coloured. *Petals* 5 or more, small, clawed, blade with a basal pit. *Stamens* very many. *Carpels* 5 or more, sessile; ovules many, 2-seriate. *Seeds* angled, testa coriaceous.—DISTRIB. 9 species, N. temperate andarctic.

1. **T. acaulis,** *Lindl. in Bot. Reg.* 1842, *Misc.* 56. *and* 1843, t. 82; stem leafy above the middle, petals short-clawed. *H. f. & T. Fl. Ind.* 41. T. pumilus, *Royle Ill.* 54 (*not of Don*).

WESTERN ALPINE HIMALAYA, from Kumaon to Kashmir, alt. 11–13,000 ft.
Rootstock stout, fibres thick. *Stem* simple, 3–6 in. in flower, 12 or more in fruit, base clothed with fibres. *Leaves* appearing with or after the flowers; radical long-petioled, palmati-5-partite, segments oblong-lanceolate, incised; cauline 1–3, similar; base of petiole sheathing. *Flowers* 2 in. diam., solitary. *Sepals* 6–8, broad-oval, spreading, obtuse or entire. *Petals* 12–16, shorter than the stamens; blade oblong. *Carpels* many, ripe 1 in., membranous, wrinkled, style persistent.—Very near *T. laxus*, Salisb. (*americanus*, DC.), and *patulus*, Salisb.

2 **T. pumilus,** *Don Prodr.* 195; cauline leaves few, all below the middle of the stem, petals long-clawed—*H. f. & T. Fl. Ind.* 41.

ALPINE HIMALAYA, in the interior ranges; Kumaon, alt. 14,000 ft.; Nipal; Sikkim, alt. 15–17,000 ft.
Rootstock horizontal. *Stem* 6–12 in., naked above, base clothed with old leaves. *Leaves* 1–2 in. diam., radical long-petioled, orbicular, coriaceous, 5-partite; segments broad-obovate, 3-lobed, toothed, base cuneate. *Flowers* 1 in. diam., solitary. *Sepals* 5–6, rounded, tip obtuse, notched, subpersistent. *Petals* 10–12, equalling the filaments, blade cuneate-oblong, obtuse, tip thickened. *Follicles* many, membranous, beaked by the short style.

12. COPTIS, Salisb.

Small stemless herbs; rootstock perennial. *Leaves* ternatisect. *Flowers* regular, small, white, on slender leafless scapes. *Sepals* 5–6. *Petals* 5–6, clawed, hooded or linear. *Carpels* few or many, pedicelled, spreading;

ovules many. *Follicles* many-seeded. *Seeds* with a black crustaceous testa. —DISTRIB. North temperate zone; species 6.—Genus too nearly allied to *Isopyrum*.

1. **C. Teeta,** *Wall. in Trans. Med. & Phys. Soc. Calc.* viii. 347; *H. f. & T. Fl. Ind.* 42; *Griff. Journ.* 37; *Notul.* iv. 733, *Ic.* iv. t. 660, f. 2.

MISHMI MTS., east of Assam, in the temperate region.

Rootstock horizontal, golden yellow, woody, densely fibrous, very bitter. *Leaves* glabrous; petioles 6–12 in.; leaflets 2–3 in., ovate-lanceolate, pinnatifid, lobes incised, terminal largest. *Scape* slender, equalling the leaves. *Flowers* 1–3, pedicelled, bracts leafy. *Sepals* ½ in., oblong-lanceolate, acute. *Petals* narrow, ligulate, obtuse, ⅔ shorter than the sepals.—Characters taken chiefly from Wallich's description; Griffiths' specimens are in leaf only. The very bitter rootstock is much used as a drug in Bengal.

13. ISOPYRUM, Linn.

Small stemless herbs; annual, or rootstock perennial. *Leaves* decompound. *Flowers* regular, white, few or solitary, on leafless or leafy slender scapes. *Sepals* 5–6, petaloid, deciduous. *Petals* 5, variable, very small or 0. *Stamens* 10 or more. *Carpels* 2–20, sessile; ovules 3 or more. *Follicles* few or many-seeded. *Seeds* with a smooth or granulated testa, crustaceous.—DISTRIB. North temperate regions; species 7.

1. **I. adiantifolium,** *H. f. & T. Fl. Ind.* 42; cauline leaves opposite or whorled compound, petals long-clawed, carpels 3.

TEMPERATE EASTERN HIMALAYA, outer moist valleys of Sikkim, alt. 7500 ft., *Hook. f.* &c.

Rootstock slender, horizontal, scaly. *Radical* leaves long-petioled, stipellate at the top of the petiole; terminal segment simple, lateral compound; leaflets 5–7 petiolulate, ¼–½ in., cuneate at the base, obtuse, crenate. *Flowers* ½ in. diam.

2. **I. thalictroides,** *Linn.*; cauline leaves alternate 3-lobed or 3-foliolate, petals hooded shortly clawed, carpels 2–4. *DC. Prodr.* i. 48; *H. f. & T. Fl. Ind.* 43. I. anemonoides, *Kar. & Kir. En. Pl. Soong.* No. 55.

TEMPERATE WESTERN HIMALAYA, north of Kashmir, *Winterbottom*; Lahul.—DISTRIB. Affghanistan, Siberia, E. Europe.

Rootstock horizontal, fibrous or scaly. *Stem* 4–8 in., slender. *Radical leaves* 2–3-ternate; leaflets 2–3-lobed, cuneate at the base, membranous. *Flowers* ½ in. diam., in few-flowered terminal panicles. *Sepals* oval, obtuse. *Petals* with a filiform claw. *Follicles* 2–4, oval, beaked by the style.—The petals are very variable in European specimens.

3. **I. grandiflorum,** *Fisch. in DC. Prodr.* i. 48; leaves all radical 2–4 times ternatisect, carpels 3–7. *Wall. Cat.* 9123; *Royle Ill.* 54, t. 11, f. 3; *H. f. & T. Fl. Ind.* 43. I. microphyllum, *Royle Ill.* l.c. f. 4.

WESTERN ALPINE HIMALAYA, from Kumaon to Balti, alt. 13–17,000 ft.—DISTRIB. Siberia.

Stems densely tufted; rootstock stout, clothed with rigid bristles. *Leaves* long-petioled; petiole auricled at the sheathing base; leaflets small, cuneate-obovate, 2–3-lobed. *Scapes* 3–4 in., equalling the leaves, with 2 small subopposite bracts. *Flower* solitary, 1–1¼ in. diam.

14. AQUILEGIA, Linn.

Erect, perennial-rooted herbs. *Leaves* ternately compound. *Flowers* regular, handsome, drooping, white purple or yellow. *Sepals* 5, regular, coloured, deciduous. *Petals* 5, funnel-shaped, produced into a spur at the base. *Stamens* many, inner reduced to scales. *Carpels* 5 or more, sessile; ovules many. *Follicles* many-seeded *Seeds* with a crustaceous testa.—Distrib. North temperate zone; species 5 or 6, with many subspecies and varieties.

1. **A. vulgaris,** *L.;* glabrous or pubescent, stem usually branched, leaves biternately compound, lobes incised sessile or petiolulate, sepals larger than the carpels and stamens, spur of petals gradually narrowed to the point.

Western Temperate and Subalpine Himalaya.—Distrib. Temp. Europe and Asia.

Subsp. 1. VULGARIS proper; glabrous or slightly pubescent, sepals ovate obtuse, spur hooked as long as the blade of the petal.—A. vulgaris, *DC.* &c.—Tibetan region.

Subsp. 2. VISCOSA; habit, &c. of *vulgaris* proper, but smaller, odorous, and covered with glandular hairs.—A. viscosa, *Gouan,* &c.—Western Tibet, abundant.

Subsp. 3. PUBIFLORA; softly pubescent, sepals ovate-lanceolate tapering to a fine point, spur short much curved.—A. pubiflora, *Wall. Cat.* n. 4714; *Royle Ill.* t. 55.—Temperate outer Himalaya.

Subsp. 4. ALPINA; pubescent or glandular, leaflets generally much cut, flowers very large, sepals obtuse or subacute, spur nearly straight.—A. alpina, *L.* &c.; *Deless. Ic.* i. t. 48. A. glandulosa, *Fisch in DC. Prodr.* i. 50.—Alpine region of the West Himalaya.

Subsp. 5. PYRENAICA; softly pubescent or glandular often glaucous, flowers often white and sweet-scented, sepals ovate acute, spur very long slender straight or hooked.—A. pyrenaica, *DC. Prodr.* i. 50. A. Kanawarensis, *Camb. in Jacq. Voy. Bot.* t. 5; *Bot. Mag.* t. 4493; A. Moorcroftiana, *Wall Cat.* n. 4713; *Royle Ill.* 55. A. Olympica, *Boiss. Fl Orient.* i. 71. A. glauca, *Lindl. Bot. Reg.* xxvi. t. 46. A. fragrans, *Benth. in Maund's Botanist,* iv. t. 151.—Alpine and temperate western Himalaya and Tibet, alt. 10–14,000 ft.

Subsp. 6. JUCUNDA; stem simple 4–8 in. leafless or with one small leaf, flower very large dark purple, sepals very broadly ovate, spur short much incurved.—A. jucunda, *Fisch & Mey.*; *Led. Fl. Ross.* i. 736.—Kashmir.

15. DELPHINIUM, Linn.

Annual or perennial erect herbs. *Leaves* palmately lobed. *Flowers* racemed or panicled, irregular, white blue or purplish. *Sepals* 5, free or cohering at the base, dorsal spurred behind. *Petals* 2–4, small; spurs of the 2 dorsal developed within that of the sepal; 2 lateral spurless or 0. *Stamens* many. *Follicles* 1–7. *Seeds* many, testa wrinkled or plaited.—Distrib. N. temperate zone; species about 40, very variable.

* Spur cylindric or inflated (not subulate or conical).

1. **D. uncinatum,** *H.f. & T.;* leaves 5-partite, segments inciso-pinnatifid, flowers ½ in. long, spur inflated hooked obtuse. D. penicillatum, *H.f. & T. Fl. Ind.* 48, *not of Boissier.* D. vestitum, *Boiss. Fl. Or.* i. 92, *not of Wall. & Royle.*

Salt range of the Punjab, *Vicary,* and West Himalaya, from Banahal to Marri; on dry hills, *Winterbottom,* &c.

Stem 1–2 ft., simple or sparingly branched, pubescent or glabrous, few-leaved. *Radical leaves* 2 in. *Flowers* in long many-flowered densely glandular-hairy or glabrous racemes. *Spur* equalling or shorter than the flower, more or less incurved. *Anterior* petals deeply 2-fid, densely hairy. *Follicles* 3, straight.

A West Asiatic form, which we formerly identified with *D. penicillatum,* of Boissier, who, however, with far better materials before him, considers it distinct. The glabrous form was found at the Margala pass, near Rawal Pindi, by Major Vicary.

2. **D. incanum,** *Royle Ill.* 55; leaves 3-partite, segments multifid, flowers 1¼ in. long, spur almost straight cylindric. *H. f. & T. Fl. Ind.* 50.

WESTERN TEMPERATE HIMALAYA, from Gores and Kashmir to Kunawer, alt. 6–8000 ft.

Stems 1½–3 ft.; simple below, leafy, hoary all over. *Radical* leaves soon withering, 2 in. diam., segments subpinnatifid, lobes linear or incised; cauline subsessile. *Racemes* simple or compound, terminal, long and dense flowered; pedicels 1 in.; bracteoles 2, linear. *Flowers* large, bright blue. *Sepals* pubescent outside, shorter than the spur. *Anterior* petals 2-fid, hairy. *Follicles* 3, puberulous.

** Spur subulate.

† *Radical leaves divided to, or almost to the base* (*see* 8, elatum).

3. **D. saniculæfolium,** *Boiss. Fl. Orient.* i. 91; stem 1–2 ft., racemes long many-flowered, flowers about ½ in. long pale blue. *H. f. & T. Fl. Ind.* 49.

WESTERN PUNJAB, on dry hills from the Indus to the Jelam, *Fleming.*—DISTRIB. Affghanistan.

Branches rigid, spreading, hoary with appressed pubescence or glabrate. *Leaves* 1½–3 in. diam., firm, lateral segments deeply 2-lobed, lobes all cuneate and cut. *Pedicels* straight, *spur* rather larger than the pale blue flowers. *Anterior petals* 3-fid, white, back hairy. *Follicles* 3, glabrous or pubescent.

4. **D. denudatum,** *Wall. Cat.* No. 4719; stem 2–3 ft., racemes many-flowered, flowers nearly 1 in. long. *H. f. & T. Fl. Ind.* 49. D. pauciflorum, *Royle Ill.* 55 (*not of Don*).

WEST TEMPERATE HIMALAYA, from Kashmir to Kumaon in grassy places.

Stem branched, glabrous or downy above. *Radical leaves* 2–6 in. diam., orbicular, 5–9-partite; segments cuneate-obovate, 2 pinnatifid, lobes oblong or linear-oblong; cauline few, uppermost 3-partite, segments linear entire. *Flowers* pale blue, in lax much-branched racemes; bracts linear; pedicels 2-bracteolate. *Sepals* pubescent outside, yellow with blue margins. *Anterior petals* deeply 2-fid, hairy on both surfaces. *Follicles* 3, inflated, glabrous or sparsely hairy.

5. **D. cæruleum,** *Jacq. ex Camb. in Jacq. Voy. Bot.* 7, t. 6; stem 3–12 in. much branched, racemes few-flowered, flowers 1 in. or more long. *H. f. & T. Fl. Ind.* 57.

ALPINE HIMALAYA, from Kumaon to Sikkim, attaining alt. 17,000 ft. in the latter country.

Stem branched from the base, leafy, spreading. *Leaves* suborbicular, 1¼–1½ in. diam., 5–7-lobed, lobes cuneate-oblong, incised or pinnatifid, segments linear. *Flowers* solitary, in long branches, or few in a loose raceme, pale blue, hairy. *Sepals* shorter than the nearly straight spur. *Anterior petals* obovate or obcordate, a little hairy. *Follicles* 5, hairy.

†† *Radical leaves orbicular or reniform, palmate to the middle* (*or base in* 8, D. elatum).

6. **D. dasycaulon,** *Fresen. Mus. Senk.* ii. 272; stem softly tomentose, flowers bright-blue, spur shorter than the sepal. *H. f. & T. Fl. Ind.* 50; *Dalz. & Gibs. Bombay Fl.* 2; *Oliver Fl. Trop. Afr.* i. 11.

Mountains of the DEKKAN near Junir, *Stocks,* &c.—DISTRIB. Abyssinia.

Stem 1½–3 ft., branched, few-leaved. *Radical leaves* 3–6 in. diam., 5-fid to the middle, pale and veined beneath, lobes broadly trapezoid, 3-fid, segments incised; cauline 5-partite, segments narrower, inciso-pinnatifid. *Racemes* lax, compound; lower bracts 2 in., leafy, oblong or lanceolate, upper linear; pedicels 1–2 in., ebracteolate. *Flowers* bright-blue, inodorous. *Sepals* ⅓–1 in., with a bearded dorsal pale spot. *Spur* conic, slightly curved, nearly ½ as long as the sepal. *Anterior petals* 2-fid. *Follicles* ¾ in., tomentose.

7. **D. altissimum,** *Wall. Plant. As. Rar.* ii. t. 128; *Cat.* 4718; stem sparsely hairy glabrous below, racemes lax few-flowered, flowers deep blue or purple, spur longer than the sepals. *Griff. It. Notes.* 54 (No. 827); *H.f. & T. Fl. Ind.* 51.

CENTRAL HIMALAYA; Nipal, *Wallich.* KHASIA HILLS, above 5000 ft., *Griffith,* &c.

Stem 2–4 ft., much branched, few-leaved, hairs spreading. *Radical leaves* 3–6 in. diam., pale beneath, 5–7-fid, lobes broadly cuneate, 3-lobed, coarsely toothed; cauline sessile, 3-lobed or entire; petiole 1 ft. and under. *Racemes* long, lax, few-flowered; pedicels often 2 in.; bracts and bracteoles linear. *Flowers* large, very fetid, hairy outside. *Spur* subulate, incurved. *Anterior petals* 2-lobed, hairy; posterior dark-purple, 2-toothed. *Follicles* 3, pubescent.

8. **D. elatum,** *L.*; stem glabrous or hairy, racemes dense-flowered, flowers pale blue or purplish, spur equalling the sepals. D. ranunculifolium, *Wall. Cat.* 4716; *H.f. & T. Fl. Ind.* 51. D. incisum, *Wall. Cat.* 4717. D. pyramidale, *Royle Ill.* 56. D. Hoffmeisteri, *Klotzsch Bot. Reise Pr. Wald.* t. 39.

WEST TEMPERATE HIMALAYA, in the inner and Tibetan valleys, alt. 10–12,000 ft.; from Kumaon to Kashmir.

Stem 2–4 ft., sparingly branched. *Leaves* 4–6 in. diam., rounded or reniform, pale beneath, 5–7-lobed or -partite, segments cuneate-oblong, 3-lobed or variously cut. *Racemes* much branched, elongate; pedicels 1–3 in.; lower bracts leafy, 3-lobed or -partite; bracteoles linear. *Flowers* hairy outside. *Sepals* elliptic, obtuse. *Spur* subulate. *Follicles* 3.

VAR. 1. *ranunculifolium;* leaves 5-lobed to about the middle, segments broadly cuneate.

VAR. 2. *incisum;* leaves 5-partite, segments narrow incised.

*** Spur inflated, conical. Flowers large; sepals connivent, membranous.

9. **D. vestitum,** *Wall. Cat.* 4715; stem hispid, leaves palmately 5–7-lobed, flowers in long dense racemes. *Royle Ill.* 55; *H.f. & T. Fl. Ind.* 52. D. rectivenium, *Royle Ill.* 56.

WEST and CENTRAL TEMPERATE HIMALAYA, alt. 8–12,000 ft., from Nipal to Kunawer.

Stem 1½–3 ft., simple below, hairs spreading or reflexed. *Radical* leaves 6–12 in. diam., lobes rounded, cut or toothed; petiole 6–12 in.; cauline 2–3, smaller. *Raceme* often 1 ft., simple or sparingly branched below; pedicels 1–3 in.; bracts linear or lanceolate, lower sometimes 3-lobed; bracteoles 2 above the middle. *Flowers* dense, large, hairy. *Sepals* membranous, broad, rounded, equalling or exceeding the conical incurved spur. *Follicles* 3.

10. **D. Cashmirianum,** *Royle Ill.* 55, t. 12; stem glabrous strigose or softly hairy, leaves palmately 5–7-lobed, lobes sharply cut, flowers in lax corymbs. *H.f. & T. Fl. Ind.* 52 (*excl. Syn.* D. Jacquemontianum, *Camb.*).

WEST TIBET and TIBETAN HIMALAYA, from Kumaon to Kashmir, alt. 11–16,000 ft.

Stem 1–1½ ft., few-leaved, glabrous or softly or hispidly hairy. *Radical leaves* 2–4 in. diam., lobes cuneate-ovate, acute, 3-lobed and cut; cauline 3–5-partite. *Branches of corymb* terminating in few-flowered racemes, upper bracts lanceolate; bracteoles linear. *Sepals* 1 in. or more long, hairy, equalling or exceeding the straight conical spur. *Follicles* 3–7, downy.—The strigose states are best distinguished from small plants of *D. vestitum,* by the inflorescence and size of the flowers.

11. **D. viscosum,** *H. f. & T. Fl. Ind.* 52; stem covered with soft brown tomentum, leaves reniform palmately 5–7-lobed, lobes obtusely crenate, flowers corymbose.

ALPINE EAST HIMALAYA; Sikkim, alt. 12–16,000 ft., *Hook. f.*

Stem 1–2 ft., branched from the base. *Leaves* 2–4 in. diam., at length glabrate, lobed to near the middle. *Flower* solitary or few at the ends of the branches of the corymb; bracts 3-partite; bracteoles linear-oblong. *Sepals* $\frac{3}{4}$ in., broadly oval, pale blue, purple, tomentose, membranous, equalling the conical incurved spur. *Follicles* 3, glabrous, ciliate on the suture.

12. **D. glaciale,** *H. f. & T. Fl. Ind.* 53; stem softly hairy, leaves 3-partite, lobes deeply multifid, flowers in lax corymbs.

ALPINE EAST HIMALAYA; Sikkim, alt. 16–18,000 ft. *Hook. f.*

Stem 3–6 in., simple, leafy. *Leaves* 2–3 in. diam., segments broadly cuneate. *Corymbs* few-flowered; bracts leafy; bracteoles many on the long pedicels, linear, or cut into linear lobes *Flowers* large, hairy. *Sepals* exceeding 1 in., orbicular, membranous, longer than the short straight conical spur. *Follicles* 4–5, $\frac{1}{2}$ in. long.—Whole plant of a rank musk odour.

13. **D. Brunonianum,** *Royle Ill.* 56; stem glabrous or downy below glandular-pubescent above, leaves 5-fid to the middle, lobes sharply cut or toothed, flowers corymbose. *H. f. & T. Fl. Ind.* 53; *Hook. Bot. Mag.* t. 5461. D. Jacquemontianum, *Camb. in Jacq. Voy. Bot.* 8, t. 7; D. moschatum, *Munro in H. f. & T. Fl. Ind.* 53.

ALPINE WEST TIBET, alt. 14,000 ft.

Stem 6–12 in., simple below, leafy. *Leaves* 3–4 in. diam., lobes cuneate-ovate; petioles very long. *Flowers* large, pale-blue, hairy; corymbs sometimes compound; bracts 3–5-partite, upper simple, oblong or linear. *Sepals* 1 in., membranous, orbicular, veined; longer than the conic spur. *Follicles* 5–6, $\frac{3}{4}$ in., viscidly pubescent; whole plant musky.—*D. moschatum* was distinguished by the colour and texture of the posterior petal, which proves to be very variable.

D. SCABRIFLORUM, *Don in Mem. Wern. Soc.* iii. 412 (D. Carela, *Don Prodr.*, 195), appears to differ from *D. altissimum*, and *vestitum* chiefly in the glabrous follicles; it is described from Nipal specimens of Wallich, but none thus named exist in the Wallichian Herbarium.

Fragments of a *Delphinium* closely allied to *D. incanum* were brought by Dr. Hooker from Tibet, north of Sikkim; it differs from *D. incanum* in the slightly notched petals, and may be new.

D. pauciflorum, Don Prodr., 196, is doubtless the cultivated *D. Ajacis* or common Larkspur.

16. ACONITUM, Linn.

Perennial, erect, rarely twining, herbs. *Leaves* palmatipartite, rarely entire. *Flowers* irregular, racemed, blue purple white or yellow. *Sepals* 5, petaloid, posterior (helmet) vaulted, the rest flat, 2 anterior narrower than the lateral. *Petals* 2–5; 2 posterior clawed, limb hooded and enclosed in the helmet, 3 lower small or obsolete. *Stamens* many. *Follicles* 3–5, sessile. *Seeds* many; testa spongy, rugose or wrinkled.—DISTRIB. North temp. zone, species about 183.

The roots of all the species, except *A. Lycoctonum*, *A. heterophyllum*, and certain forms of *A. Napellus*, are poisonous, and called Bikh or Bish by the Hill people. We have omitted the characters taken from the petals (which are over much relied on by systematists) because they are so variable and so difficult of exact discrimination in dried specimens.

The genus NIRBISIA of Don (Gen. Syst. Gard. i. 63) was founded on an indeterminable species of this genus.

1. **A. uncinatum,** *Linn.;* stem twining, leaves palmately 3–5-fid, flowers panicled, helmet with a short blunt dorsal cone, testa plaited. *DC. Prodr.* i. 60. A variegatum, *H.f. & T. Fl. Ind.* 56 (*not of L.*).

East Temperate Himalaya; Sikkim, Lachoong valley, alt. 9000 ft., *Hook. f.*
Stem several feet long, very slender, weak, sparingly branched, glabrous or puberulous. *Leaves* 3–4 in. broad, lobes cuneate-ovate sharply cut and toothed; bracts similar. *Flowers* ⅔–1 in. long, in open large panicles, yellowish or bluish-green. *Helmet* much arched, bluntly beaked in front. *Spur* reflexed. *Follicles* 5, glabrous.—Specimens too scanty for correct identification.

2. **A. Lycoctonum,** *Linn.;* stem erect much branched, leaves palmately deeply 5–9-lobed, racemes branched, helmet with a short beak and long cylindric or conical dorsal prominence, testa plaited. *DC. Prodr.* i. 57. *H.f. & T. Fl. Ind.* 72. A. læve, *Royle Ill.* 56.

West Temperate Himalaya; Kumaon to Kashmir, alt. 7–10,000 ft.—Distrib. Europe, N. Asia.
Stem 3–6 ft., glabrous or pubescent. *Leaves* 6–10 in. diam., lobes cuneate-ovate, sharply cut, lower long petioled, upper sessile. *Racemes* long, tomentose; bracts minute. *Flowers* pale yellow or dull purple, variable in size. *Follicles* 3, spreading.

3. **A. luridum,** *H. f. & T. Fl. Ind.* 55; stem erect simple, leaves palmately 5-fid below the middle, raceme simple, helmet with a long straight beak and broad dome-like dorsal prominence, testa smooth.

Alpine East Himalaya; Sikkim, alt. 14,000 ft., *Hook. f.*
Stem 2-3 ft., slightly pubescent, few-leaved. *Radical leaves* 2–3 in. diam., segments cuneate-ovate, 3-fid and coarsely crenate, petiole long; cauline 2–5-partite. *Raceme* ½-1 ft., pedicels short; lower bracts leafy, sessile, 3–5-partite, upper entire. *Flowers* dull red. *Sepals* brown-tomentose. *Follicles* 3–5, erect.

4. **A. palmatum,** *Don Prodr.* 196; stem erect simple below, leaves reniform deeply 5-lobed, panicle few-flowered, helmet much vaulted shortly beaked, testa plaited. *Wall. Cat.* 4723; *Royle Ill.* 57; *H.f. & T. Fl. Ind.* 56; A. lethale, *Griffith Notul.* iv. 732.

Temperate Himalaya, from Sikkim to Garwhal, alt. 8–10,000 ft.; Mishmi, *Griffith.*
Stem 2–5 ft., leafy, glabrous. *Leaves* 4–6 in. diam., sinus shallow; segments cuneate-ovate, deeply sharply cut; petioles long. *Flowers* large, greenish-blue, pedicels long. *Helmet* rather higher than broad. *Follicles* 5, 1–1½ in. long, glabrous.

5. **A. ferox,** *Wall. in Seringe Mus. Helvet.* i. 160, *& in DC. Prodr.* i. 64 (*not of Plant. As. Rar.*); stem erect simple below, leaves rounded or oval palmately 5-fid, raceme terminal dense-flowered, helmet vaulted with a short sharp beak, testa plaited. *Wall. Cat.* 4721, *B C D; H.f. & T. Fl. Ind.* 56; A. virosum, *Don Prodr.* 196.

Temperate Subalpine Himalaya, from Sikkim to Garwhal, alt. 10–14,000 ft.
Stem 3–6 ft., puberulous, leafy. *Leaves* 3–6 in.; lobes cuneate-ovate, incised. *Raceme* 6-12 in, simple or sparingly branched below, tomentose; pedicels 1–2 in. thickened at the top; bracts pinnatifid; bracteoles linear. *Flowers* large, pale dirty blue. *Helmet* about twice as long as high. *Follicles* 5, erect, usually densely villous, glabrous in some Garwhal specimens.

6. **A. Napellus,** *Linn.;* stem erect simple, leaves palmatipartite, segments linear multifid, raceme simple few- or many-flowered, helmet shallow, tapering to a slender beak, testa smooth. *DC. Prodr.* i. 62; *H.f. & T. Fl. Ind.* 57.

TEMPERATE ALPINE HIMALAYA, from 10,000 ft. to the highest limit of vegetation in the N. W. provinces.—DISTRIB. Temp. and arctic Europe, Asia, and America.

Stem 6 in.–3 ft., often decumbent in small states, glabrous or slightly pubescent. *Leaves* very variable in size, ultimate divisions linear. *Racemes* simple or sparingly compound; bracts entire or 3-fid. *Flowers* $\frac{3}{4}$–1 in. long, bright or dull greenish-blue. *Helmet* three times as long as high. *Follicles* 3–5, in the Indian forms hairy.—An extremely variable plant, of which we have vainly attempted to refer the Indian forms to those indicated by Regel. The small alpine forms closely resemble the arctic American forms of *A. delphinifolium.* The roots of vars. 1 and 2 are poisonous, but those of 3 and 4 are eaten by the Bhoteas.

VAR. 1. NAPELLUS proper; stem 2-3 ft. leafy, raceme dense flowered.

VAR. 2. RIGIDUM; stem 2–3 ft. few-leaved, leaves firm subcoriaceous with spreading falcate sharp teeth, raceme lax few-flowered, tomentose. A. dissectum, *Don Prodr.* 197; *Wall. Cat.* 4724; *Royle Ill.* 54. A. ferox. *Wall. Cat.* 4721 A; *Plant As. Rar.* t. 41.

VAR. 3. MULTIFIDUM; stem 6–12 in. erect or decumbent few-leaved, leaves 1–2 in. diam. many-lobed to the base, lobes cut into linear segments; racemes lax few- or many-flowered. A. multifidum, *Royle Ill.* 56. A. oliganthemum, *Kern. Nov. Pl. Sp. Dec.* ii. 23.

VAR. 4. ROTUNDIFOLIUM; like var. 3, but leaves not divided to the base. A. rotundifolium, *Kar. & Kir.; Led. Fl. Ross.* n. 1740. A. Tianschanicum, *Osk. & Rupr. Sert. Tian. in Mem. Acad. St. Petersb.* 1869.

7. **A. heterophyllum,** *Wall. Cat.* 4722; stem erect leafy, leaves broad ovate or orbicular-cordate more or less 5-lobed and -toothed, upper entire amplexicaul, raceme many-flowered, helmet shortly beaked, testa smooth. *Royle Ill.* 56, t. 13; *H. f. & T. Fl. Ind.* 58. A. cordatum, *Royle Ill.* 56. A. Atees, *Royle in Journ. As. Soc. Bengal,* i. 459.

WEST TEMPERATE HIMALAYA, from Kumaon to Hasora, alt. 8–13,000 ft.

Stem 1–3 ft., simple or branched from the base, glabrous below, puberulous above. *Leaves* 2-4 in., acute or obtuse; cauline sharply toothed, the lowest long petioled and not amplexicaul. *Racemes* often panicled; bracts sharply toothed, upper 3-fid or entire. *Flowers* more than 1 in. long, bright blue, greenish blue with purple veins. *Helmet* half as high as long. *Follicles* 5, downy.—Root much valued in India, according to Royle, as a febrifuge and tonic.

17. **ACTÆA,** Linn.

An erect perennial herb. *Leaves* alternate, ternately compound. *Flowers* small, in short crowded racemes. *Sepals* 3–5, rather unequal, petaloid. *Petals* 4–10, small, spathulate, or 0. *Stamens* many, filaments slender. *Carpel* 1, many-ovuled; stigma sessile, dilated. *Berry* many-seeded. *Seeds* depressed; testa coriaceous, smooth.

1. **A. spicata,** *Linn.;* leaflets ovate-lanceolate entire or 3-lobed acutely serrate. *DC. Prodr.* i. 65; *H. f. & T. Fl. Ind.* 59. A. acuminata, *Wall. Cat.* 4726; *Royle Ill.* 57.

TEMPERATE HIMALAYA, from Bhotan, *Griffith*, to Hazara.—DISTRIB. Europe, N. Asia, N. America. (Bane-berry.)

Stem 2–3 ft., erect, from a woody horizontal rootstock, covered at the base with leafless sheaths. *Leaves* 1 ft.; leaflets $\frac{1}{2}$–2 in. *Raceme* 1–3 in.; pedicels filiform. *Flowers* $\frac{1}{4}$ in. diam., white. *Berry* elliptic or subglobose; black in the European and Himalayan form, white and red in the American.

18. **CIMICIFUGA,** Linn.

Erect perennial herbs. *Leaves* 2–5-ternately divided. *Flowers* in long slender racemes, regular. *Sepals* 4–5, deciduous, petaloid. *Petals* (or transformed stamens) 1–8, small, clawed, 2-horned at the tip. *Stamens* many, filament slender. *Carpels* 1–8, many-ovuled. *Fruit* of many-seeded follicles. *Seeds* compressed, testa smooth or scaly.—DISTRIB. Europe, N. Asia, N. America; species about 8.

1. **C. fœtida,** *Linn.*; leaflets ovate or lanceolate serrate glabrous or downy, racemes panicled. *H. f. & T. Fl. Ind.* 59. C. frigida, *Royle Ill.* 57. Actæa cimicifuga, *L.*; *DC. Prodr.* i. 64. A. frigida, *Wall. Cat.* 4725.

TEMPERATE HIMALAYA, from Bhotan, *Griffith*, to Gores and Kashmir; alt. 7–12,000 ft.—DISTRIB. E. Europe, Siberia.

Stem 3–6 ft., leafy, branched, glabrous below, tomentose above. *Leaflets* 2–3 in., pale beneath, terminal often 3-lobed. *Racemes* rarely simple. *Flowers* small, yellowish. *Petals* more or less 2-fid. *Follicles* 4–8, ½ in. long.

19. PÆONIA, Linn.

Erect, stout, leafy, perennial herbs or undershrubs. *Leaves* alternate, compound. *Flowers* large, solitary or panicled, white or red. *Sepals* 5, herbaceous, persistent. *Petals* 5-10, larger than the sepals. *Stamens* many. *Carpels* 1–5, girt below by a fleshy disk, many-seeded. *Fruit* of 1 or more coriaceous few-seeded follicles. *Seeds* large, subglobose, testa thick; albumen fleshy.—DISTRIB. N. temp. zone; species 3–4.

1. **P. emodi,** *Wall. Cat.* 4727; flowers usually in the axils of the upper leaves long peduncled, follicles 1 rarely 2. *Royle Ill.* 57; *Hook. f. in Bot. Mag.* t. 5719. P. officinalis, *H. f. & T. Ind.* 60 (*not of L.*).

WEST TEMPERATE HIMALAYA; alt. 5–10,000 ft., from Kumaon to Hazara.

Erect, 1–2 ft., glabrous. *Leaves* 6–12 in., once or twice ternatisect; leaflets decurrent, entire or incised, ultimate segments oblong or lanceolate, acute or acuminate, glabrous, glaucous beneath. *Flowers* 3–8; buds globose; bracts 2–3, leafy, appressed to the calyx. *Sepals* rounded, outer with a leafy point. *Follicles* ovoid, obtuse, strigose or glabrous.—The specimens from the outer Himalaya are usually 1-carpellary, from the inner 2-carpellary.

VAR. 1. EMODI proper; follicles strigose with yellow-brown hairs.

VAR. 2. GLABRATA; follicles glabrous.—Very near the Siberian, *P. albiflora*, but monocarpellary.

ORDER II. DILLENIACEÆ. (By Hooker f. & Thomson.)

Trees shrubs or herbs, sometimes climbing. *Leaves* alternate, simple, entire or toothed (pinnatipartite in *Acrotrema*), exstipulate with sheathing petioles, or more rarely with lateral deciduous stipules. *Flowers* yellow or white, often showy. *Sepals* 5, imbricate, persistent. *Petals* 5 (rarely 3 or 4) deciduous. *Stamens* many, hypogynous, many-seriate; anthers innate, with lateral slits or terminal pores. *Carpels* 1 or more, free or cohering in the axis; styles always distinct; ovules amphitropous, solitary or few and ascending, or many and attached to the ventral suture. *Fruit* of follicles, or indehiscent and subbaccate. *Seeds* solitary or many, arillate, testa crustaceous, raphe short, albumen fleshy; embryo minute, next the hilum.—DISTRIB. Chiefly tropical; species about 200.

TRIBE I. **Delimeæ.** *Filaments* thickened upwards; anthers short, cells, remote oblique.

Carpel solitary . . . . 1. DELIMA.
Carpels 2–5 . . . . 2. TETRACERA.

TRIBE II. **Dillenieæ.** Filaments not thickened upwards; anthers with parallel cells.

Carpels 3; stemless herbs, leaves all radical large . . . 3. ACROTREMA.
Carpels 3; trees or shrubs . . . . 4. SCHUMACHERIA.
Carpels 5–20; seeds arillate . . . . 5. WORMIA.
Carpels 5-20; seeds not arillate . . . . 6. DILLENIA.

1. **DELIMA,** Linn.

A woody climber. *Leaves* very scabrid, parallel-veined. *Flowers* many, in terminal panicles, hermaphrodite, white. *Sepals* 5. *Petals* 2–5. *Stamens* many; filaments dilated upwards; cells much diverging. *Ovary* solitary, subglobose, narrowed into a subulate style; ovules 2–3, ascending. *Follicles* ovoid, coriaceous, 1-seeded. *Seed* with a cupular toothed aril.

1. **D. sarmentosa,** *Linn.; DC. Prodr.* i. 69; *Wall. Cat.* 6632; *Bot. Mag.* t. 3058. Tetracera sarmentosa, *Willd.; Roxb. Fl. Ind.* ii. 645. Leontoglossum scabrum, *Hance. in Walp. Ann.* iii. 812.

Eastern tropical India, from ASSAM to SINGAPORE.—DISTRIB. Eastern Archipelago.

Leaves 3–5 in., obovate ovate or broadly lanceolate, obtuse or acute, strongly nerved, quite entire serrate or crenate, appressed-pilose. *Flowers* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., in tomentose or pilose spreading panicles that are often leafy. *Sepals* reflexed.—A very variable plant indeed.

VAR. 1. GLABRA; fruit glabrous.

VAR. 2. HEBECARPA; fruit hairy. D. hebecarpa, *DC. Prodr.* i. 70; *Deless. Ic. Sel.* t. 72; *Wall. Cat.* 6633. D. intermedia, *Blume.*

2. **TETRACERA,** Linn.

Trees or climbing shrubs, smooth scabrid or pubescent. *Leaves* with parallel lateral veins. *Flowers* in terminal or lateral panicles, hermaphrodite or partially 1-sexual. *Sepals* 4–6, spreading. *Petals* 4–6. *Stamens* many, filaments dilated upwards, anther-cells distant. *Carpels* 3–5; ovules many, 2-seriate. *Follicles* coriaceous, shining. *Seeds* 1–5, with a fimbriated or toothed aril.—DISTRIB. All tropical; species about 24.

1. **T. lævis,** *Vahl Symb.* iii. 71; glabrous, leaves smooth, sepals silky inside glabrous outside, follicles 1–2-seeded. *DC. Prodr.* i. 68; *Wall. Cat.* 6627: *H.f. & T. Fl. Ind.* 62. T. Rheedii, *DC. Prodr.* i. 68; *W. & A. Prodr.* 5; *Wight Ic.* t. 70. T. trigyna, *Roxb. Fl. Ind.* ii. 645. T. sericea, *Bl. Bijd.* 3.

WESTERN PENINSULA; forests of Malabar; and in CEYLON. — DISTRIB. Java to Borneo.

Branches angular. *Leaves* 3–5 in., oblong or lanceolate, glabrous, entire or remotely toothed, veins rather distant. *Panicles* terminating leafy branches, few- or many-flowered. *Sepals* broadly oval.

2. **T. Assa,** *DC. Prodr.* i. 68; young branches strigose, leaves glabrous or hairy on the nerves beneath, sepals glabrous on both surfaces, ciliolate, follicles 3–5-seeded. *Wall. Cat.* 6629; *W. & A. Prodr.* 5 *in note; H.f. & T. Fl. Ind.* 63.

Eastern Bengal and Eastern Peninsula, from Chittagong to Sincapore.—Distrib. Java, Philippines.

Leaves 2–4 in., oblong, serratures remote. *Sepals* broadly oval.

3. **T. Euryandra,** *Vahl Symb.* iii. 71; young branches tomentose, leaves rigid, shining above, pubescent beneath, panicle few-flowered, sepals pubescent outside and densely ciliate, follicles 2–3-seeded. *DC. Prodr.* i. 68; *Roxb. Fl. Ind.* ii. 646; *H.f. & T. Fl. Ind.* 63. T. lucida, *Wall. Cat.* 6631.

Eastern Peninsula; Malacca and Sincapore.—Distrib. Moluccas and New Caledonia.

Branches angular. *Leaves* 2–5 in., elliptic-oblong and obtuse, or oblong lanceolate and mucronate, entire or subdentate at the tip; petiole short. *Panicle* terminal, leafy, many-flowered. *Sepals* ovate-oblong.

4. **T. macrophylla,** *Wall. Cat.* 6628 (by error *macrocarpa*); young branches pubescent, leaves rigid scabrid on both surfaces, panicle decompound many-flowered, sepals puberulous outside, follicles 1-seeded. *H.f. & T. Fl. Ind.* 63.

Eastern Peninsula, Malacca and Sincapore.

3. ACROTREMA, Jack.

Stemless perennial herbs, with horizontal woody rootstocks. *Leaves* large, gland-dotted, entire toothed or pinnatipartite, with sheathing deciduous stipules. *Scape* usually short, axillary, clothed with membranous imbricated scales. *Flowers* in short racemes, yellow. *Sepals* 5. *Petals* 5. *Stamens* 15–50, in 3 bundles which alternate with the carpels; filaments filiform; anthers erect, cells dehiscing from the middle to the tip. *Carpels* 3, slightly cohering in the axis; styles subulate, recurved; ovules 2 or more. *Fruit* of 3 follicles, bursting irregularly. *Seed* with a membranous aril, testa crustaceous pitted.—Distrib. Species about 8, all Indian.

A remarkable genus of very variable species. The descriptions apply to adult foliage only, all have the young leaves silky.

* Carpels 1–2-seeded.

1. **A. costatum,** *Jack. in Mal. Misc. ex Hook. Bot. Misc.* ii. 82; leaves obovate base sagittate toothed, flowers 8–10 in lax racemes, stamens 15. *Wall. Cat.* 1117 A.; *H.f. & T. Fl. Ind.* 65. A. Wightianum, *W. & A. Prodr.* 6; *Wight Ill.* t. 9.

Eastern Peninsula, from Moulmein to Sincapore.

Leaves 3–6 by 1½–2½ in., rough with stiff hairs, toothed and densely ciliate, veins beneath pale and hairy, petiole short. *Scape* shorter than the leaves, setose; pedicels much longer than the linear bracts. *Ovules* collateral, ascending.—In the Flora Indica Travancore is given as a habitat for this species on the faith of a single specimen in the Wightian Herbarium fastened in the same sheet *A. Arnottianum*, and collected by Kœnig, who though he formed most of his collections in the Madras Peninsula, also visited the Straits of Malacca.

** Carpels many-seeded.

† *Leaves not pinnate or pinnatifid.*

2. **A. Arnottianum,** *Wight Ill.* 9, t. 3; leaves obovate-oblong obtuse base rounded or cordate sharply toothed, scape many-flowered. *H.f. & T. Fl. Ind.* 64. A. costatum, *Wall. Cat.* 1117 B. A. Wightianum, *Wall. Cat.* 3669 (*not of W. & A.*).

Western Peninsula, Malabar and Travancore.

Leaves 6–12 by 3–5 in., ciliate and covered with long distant soft hairs, otherwise glabrous; petioles 1–3 in., broadly winged, but not to the base. *Racemes* axillary, 2–3 in.; pedicels 2–4 in., clothed with long hairs. *Sepals* nearly ½ in.

3. **A. uniflorum,** *Hook. Ic. Plant.* t. 157; leaves obovate-oblong base cordate entire or toothed scabrid on both surfaces, scape 1–2-flowered, very short, stamens 30–50. *H.f. & T. Fl. Ind.* 64; *Thwaites Enum.* 2. A. bullatum, *and* A. sylvaticum, *Thw. l.c.* 2 & 3.

Central and Southern Provinces of Ceylon, in shady moist places, alt. 2–4000 ft.

Leaves 4–9 by 1–3 in., tapering to the cordate base; petiole ½–2 in., narrowly winged. *Flowers* small, pedicels 1–2 in.—A very variable plant of which the following varieties seem the best marked:—

Var. 1. petiolaris, *Thw. l.c.*; leaves narrow obovate, petioles 2–3 in.

Var. 2. rotundatum, *Thwaites, l.c.*; leaves very broad nearly entire, hairs stiffish, petioles very short.

Var. 3. bullatum; leaves narrow softly silky bullate, petioles very short, pedicels appressed hairy.—A. bullatum, *Thw. l.c.*

Var. 4. appendiculatum; leaves deeply serrate at the very base, almost lyrate, petioles short.

Var. 5. sylvaticum; leaves minutely pilose hirsute with rigid hairs on the nerves beneath, base deeply cordate, petiole and pedicels short.—A. sylvaticum, *Thw. l.c.*

4. **A. Walkeri,** *Wight ex Thwaites Enum. Ceyl. Pl.* 3; leaves narrowly obovate-oblong bullate sharply toothed ciliate laxly hairy above, base auricled, raceme very short, stamens about 15. *Hook. Bot. Mag.* t. 5353.

Central Province of Ceylon, alt. 2–4000 ft., *Thwaites.*

Leaves 2–4 by ½–1½ in., rugose, dull red and hairy on the veins beneath; petiole very short. *Racemes* axillary; pedicels 1–2 in., laxly villous.

Var. argyroneuron, *Thwaites, l.c.* 398; leaves larger, midrib and veins above white.

5. **A. intermedium,** *Thwaites Enum.* 3; leaves obovate-lanceolate acute crenate-toothed coarsely hairy above, base auricled, petiole margined, racemes short, subsessile, pedicels and calyx hirsute, stamens about 40.

Bank of streams Ambagamowa district of Ceylon, *Thwaites.*

Rootstock elongate. *Leaves* 6–12 by 1–2 in., more or less hirsute above, and appressed hairy on the veins beneath; petiole 1–1½ in., margined.

6. **A. lanceolatum,** *Hook. Ic. Pl. under* t. 157; leaves very narrowly lanceolate sinuate-toothed, glabrous above, scape very short, stamens about 40. *H.f. & T. Fl. Ind.* 65; *Thw. Enum.* 3.

Kittool Galle, in Ceylon.

Rootstock short. *Leaves* 4–12 by ½–1 in., acute, appressed-hairy on the costa and nerves beneath; petiole 1½–1 in., hairy, margined. *Pedicels* 1–2 in., hirsute.

7. **A. Gardneri,** *Thwaites Enum.* 3; leaves narrowly spathulate acute sinuate with inflexed rigid teeth glabrous above substrigose on the veins beneath, scape very short, stamens about 15.

Between Galle and Ratnapoora, Ceylon, by banks of streams, *Thwaites.*

Rootstock horizontal. *Leaves* 2–4 by ¼–½ in., base auricled, nerves beneath with appressed hairs. *Racemes* short; pedicels 1–2 in., with appressed hairs.—Very near *A. lanceolatum,* but differing in the number of stamens, perhaps not a constant character.

8. **A. Thwaitesii,** *H. f. & T. in Kew Journ. Bot.* viii. 241, t. 4 A.; leaves lanceolate pinnatifid to or beyond the middle, hairy above and on the nerves beneath, scape very short, stamens about 20.

In the Dolosbage district, CEYLON, *Thwaites.*
Rootstock small, short. *Leaves* 3–6 by 1–1½ in., segments linear-oblong, acute, entire or toothed; petioles very short. *Pedicels* 1–1½ in., slender, pilose. *Sepals* hirsute.

9. **A. dissectum,** *Thwaites in Hook. Kew Journ. Bot.* viii. 242, t. 4 B.; leaves lanceolate interruptedly pinnatisect, softly hairy, scape very short.

At Hinidoon Korle, CEYLON, *Thwaites.*
Rootstock horizontal. *Leaves* 2–4 by 1–1½ in., larger segments acutely lobed, with two or more pairs of very small segments between each pair, white and silky beneath, segments sometimes petiolulate. *Pedicels* slender, with spreading hairs. *Flowers* very small, ⅕ in. diam.

10. **A. lyratum,** *Thwaites in Hook. Kew Journ.* viii. 242; leaves linear-oblong obtuse lyrate-pinnatifid toothed, glabrous except the nerves beneath, base cordate, scape long naked below, pedicels glabrous, stamens about 35.

At Hinidoon Korle, in CEYLON, *Thwaites.*
Rootstock stout, ascending. *Leaves* 3–12 by 2–4 in., coriaceous, terminal segment equalling ⅔ of the whole leaf, lateral segments 3–5 pair, small, rounded, adnate by a broad base, deflected, sharply toothed; petiole margined. *Scape* 1–3 in.; bracts recurved; pedicels 1 in., often recurved. *Sepals* glabrous or puberulous. *Flowers* about ½ in. diam.

4. SCHUMACHERIA, Vahl.

Erect or sarmentose shrubs, branches flexuous. *Leaves* coriaceous, lateral nerves many, very strong. *Flowers* yellow, 2-bracteolate, in axillary or terminal secund simple or panicled spikes. *Sepals* 5. *Petals* 5. *Stamens* indefinite, many-seriate, unilateral, filaments very short united into a short oblique cylindric posticous column; anther-cells dehiscing longitudinally. *Carpels* 3, distinct, pilose; styles filiform-subulate; ovules solitary. *Ripe carpels* indehiscent. *Seed* erect, subglobose, arillate, testa crustaceous.—DISTRIB. All Cinghalese.

1. **S. angustifolia,** *H. f. & T. Fl. Ind.* 66; leaves oblong-lanceolate tapering to a fine point serrate, spikes axillary simple or panicled shorter than the leaves. *Thw. Enum.* 4.

At Hinidoon Korle, in CEYLON, abundant.
Branches slender, young silky, old glabrous. *Leaves* 4–6 by 1–1¼ in., glabrous and shining above, puberulous on the veins beneath, base rounded or narrowed; petiole ½ in. *Spikes* 1–2 in.

2. **S. alnifolia,** *H. f. & T. Fl. Ind.* 66; leaves broadly oval acute or subacute sinuate or toothed, spikes axillary panicled shorter than the leaves. *Thw. Enum.*

Forests in the Ambagamowa and Hunasgiria Districts of CEYLON, *Thwaites.*
Branches strigose, old glabrous. *Leaves* 4–6 by 3–4 in., base obtuse, glabrous above, beneath strigose on the nerves, and pubescent or glabrate between them; petiole scabrid or hirsute. *Spikes* 1–2 in.
VAR. 1. SCABRA, *Thw. l.c.;* leaves scabrid with distant rigid hairs.

VAR. 2. DENTATA, *Wight. mss.; Thw. l.c.;* leaves acutely coarsely toothed beneath and the petioles hirsute.

VAR. 3. SUBGLABRA, *Thw. l.c.;* leaves subglabrous beneath.

3. **S. castaneæfolia,** *Vahl, in Act. Hafn.* vi. 122; leaves broadly oblong crenate or sinuate, spikes in much branched terminal panicles longer than the leaves. *Wight Ill.* i. 9, t. 4; *H. f. & T. Fl. Ind.* 66; *Thw. Enum.* 4.

In the Saffragam and Galle Districts of CEYLON.

Branches hoary, at length glabrate. *Leaves* 4–10 by 2–4 in., usually obtuse at both ends, but sometimes acute at either, glabrous above, hoary on the veins beneath. *Panicle* sometimes leafy. *Flowers* variable in size.

5. **WORMIA,** Rottb.

Trees, sometimes lofty, or shrubs. *Leaves* broad; lateral nerves many, strong, parallel; petioles usually with deciduous stipular wings. *Flowers* large, in terminal racemes or panicles. *Sepals* 5. *Petals* 5. *Stamens* indefinite, in several series, nearly free; anthers linear, erect, cells opening by 2 pores. *Carpels* 5–10, scarcely cohering in the axis; ovules numerous. *Fruit* of indehiscent or follicular 3- or more-seeded carpels. *Seeds* with a fleshy aril.—DISTRIB. Tropical Asia and Australia, and one in Madagascar; species about 9.

SECT. I. **Capellia,** *Blume* (genus). Inner row of stamens much longer than the outer and arching over them.

1. **W. suffruticosa,** *Griff. Notul.* iv. 706; *Ic.* iv. t. 649, f. 1; leaves oval- or elliptic-lanceolate sharply toothed, petiole broadly winged. W. excelsa, *H. f. & T. Fl. Ind.* 67. (*excl. syn.*) W. subsessilis, *Miq. Fl. Ned. Ind. Suppl.* i. 618; *Ann. Mus. Lugd. Bot.* i. 315, t. 9.

EASTERN PENINSULA, at Malacca and Sincapore.—DISTRIB. Extends to Borneo and Banka.

A shrub or small tree, young parts floccose. *Leaves* 4–12 by 2–5 in., acute or rounded at each end, coriaceous, glabrous, with scattered hairs on the veins beneath; petioles ½–2 in., wing entire. *Flowers* 4 in. diam., bright yellow, in leaf-opposed simple or forked racemes; pedicels alternate, ½–1 in., top thickened. *Sepals* ovate, obtuse, subequal, persistent. *Petals* obovate, crenulate *Carpels* about 7, 3–5-seeded.—*W. excelsa,* with which we had confounded this (Fl. Ind. l.c.) is distinguished by its crenate leaves and narrow petiolar wing.

2. **W. oblonga,** *Wall. Cat.* 951; leaves oval or oblong entire or subcrenate, petiole scarcely winged. *H. f. & T. Fl. Ind.* 67.

EASTERN PENINSULA; Penang, Malacca, and Sincapore.

A tree, bark black; young parts tomentose, old glabrate. *Leaves* 4–8 by 2–4 in., coriaceous, glabrous when mature; petiole 1–2 in. *Flowers* 3–4 in. diam., in terminal leafy flexuous few-flowered panicled racemes; pedicels 1 in., thickened upwards, tomentose. *Sepals* orbicular, young covered with appressed yellow pubescence, mature glabrate. *Carpels* 8–10.—Very near *W. excelsa,* Jack.

SECT. II. **Euwormia.** Filaments all erect and nearly equal in length.

3. **W. triquetra,** *Rottb. Nov. Act. Hafn.* ii. 532, t. 3; leaves broadly oval repand-toothed or sinuate, petioles with broad membranous sheathing deciduous stipular wings. *H. f. & T. Fl. Ind.* 67; *Thw. Enum.* 4. W. den-

tata, *DC. Prodr.* i. 75. Dillenia dentata, *Thunb. in Trans. Linn. Soc.* i. 201, t. 20.

Moist warm parts of CEYLON, up to 2000 ft.

A tree, bark black, young parts hoary. *Leaves* 5–8 by 4–5 in., tip obtuse or subtruncate, base rounded; petiole 2–3 in. *Flowers* 2 in. diam., white, in subterminal leaf-opposed secund few-flowered racemes; pedicels 1 in., thickened upwards. *Carpels* 5, indehiscent, 1–2-seeded.

4. **W. pulchella,** *Jack, Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 221; leaves obovate obtuse, nerves distant, petiole slightly margined. *H. f. & T. Fl. Ind.* 68.

EASTERN PENINSULA: Malacca, *Griffith.*—DISTRIB. Sumatra.

A small tree; branches dark grey, glabrous. *Leaves* 4–5 by 2–3 in., quite entire, coriaceous, tip obtuse, truncate or retuse, mucronate, base acute, nerves rather distant; petiole 1 in., channelled, base slightly sheathing. *Flowers* 2 in. diam., on axillary leaf-opposed ebracteate peduncles. *Sepals* broadly ovate, glabrous. *Follicles* 5, few-seeded. *Seeds* few, aril red pulpy.

6. DILLENIA, Linn.

Trees. *Leaves* broad, with conspicuous parallel lateral nerves. *Flowers* large, solitary or fascicled, yellow or white. *Sepals* 5, spreading. *Petals* 5, broad. *Stamens* nearly free; anthers linear, bursting by small slits or pores; inner erect or recurved introrse, outer recurved extrorse. *Carpels* 5–20, cohering in the axis; ovules indefinite. *Fruit* globose, formed of the matured indehiscent carpels inclosed in the thickened calyx. *Seeds* naked or immersed in pulp, exarillate.—DISTRIB. Tropical Asia; species 12.

SECT. I. **Eudillenia.** *Leaves* persistent. *Flowers* white, (always?) appearing with the leaves, solitary or racemed, terminal or leaf-opposed.

1. **D. indica,** *Linn.;* leaves lanceolate serrate, flowers solitary very large, sepals fleshy. *Hamilton in Trans. Linn. Soc.* xv. 99. D. speciosa *and* D. elliptica. *Thunb. in Trans. Linn. Soc.* i. 200; *DC. Prodr.* i. 76; *Wall. Cat.* 943; *W. & A. Prodr.* 5; *Wight Ic.* 823; *H. f. & T. Fl. Ind.* 69.

Tropical forests in the WESTERN PENINSULA, Behar and Ceylon, and the HIMALAYA, from Nipal to Assam. EASTERN PENINSULA from Silhet to Sincapore.—DISTRIB. Malay Archipelago.

A round headed tree, branchlets tomentose. *Leaves* 8–10 by 2–4 in., fascicled at the ends of the branches. acute, veins close-set, glabrous above, pubescent especially on the nerves beneath. *Flowers* 6 in. diam., subterminal. *Sepals* orbicular, thick and fleshy. *Petals* white, obovate. *Inner stamens* arching over the outer. *Seeds* compressed, margins hairy.

2. **D. ovata,** *Wall. Cat.* 945; leaves ovate denticulate, flowers solitary, sepals thick. *H. f. & T. Fl. Ind.* 70.

EASTERN PENINSULA; Pinang, *Wallich,* &c.

A tree, branches softly tomentose. *Leaves* 8 by 5 in., acute or subacute, base rounded and suboblique, glabrous or pubescent on the nerves above, softly pubescent beneath; petiole 1–1½ in., tomentose. *Flowers* on terminal or leaf-opposed peduncles 2 in. long —Colour of flower unknown.

3. **D. meliosmæfolia,** *H. f. & T.;* leaves obovate-oblong acuminate serrate, flowers 1–2 terminal, sepals densely tomentose.

EASTERN PENINSULA; Malacca, *Griffith.*

A tree; bark grey, striated; branchlets densely clothed with fulvous tomentum.

Leaves 6–8 by 2½–3½ in., base acute, pilose on the nerves above, shortly hairy especially on the nerves beneath, nerves 16–18 on each side, oblique, terminating in short sharp serratures; petiole 1 in., brown, hairy. *Peduncles* 1–1½ in., densely clothed with brown tomentum. *Sepals* nearly 1½ in., ovate.—Only two specimens seen, with imperfect flowers.

4. **D. bracteata,** *Wight Ic.* t. 358; leaves oblong crenate, flowers racemed, sepals suborbicular silky. Wormia bracteata, *H. f. & T. Fl. Ind.* 68; ? D. repanda, *Roxb. Fl. Ind.* ii. 652.

WESTERN PENINSULA; mountains of Maisor.

A tree, young branches silky-pubescent. *Leaves* densely fascicled, 3–6 by 1½–3 in., coriaceous, subacute or obtuse, shining above, puberulous on the nerves beneath. *Racemes* 1–2 in., few-flowered, subterminal or leaf-opposed. *Flowers* 2½–3 in. diam. *Stamens* all equal, anthers 2-porose. *Carpels* 5, membranous, indehiscent.—Roxburgh's description of *D. repanda,* a native of Hindostan, differs but little from the above in the retuse repand smooth leaves, 5–7-flowered raceme, and villous calyx; we know of no specimen or drawing.

5. **D. retusa,** *Thunb. in Trans. Linn. Soc.* 200, t. 19; leaves obovate-oblong truncate or retuse quite entire or sinuate-toothed, flowers 1–3 on a peduncle. *Lamk. Ill.* t. 492; *DC. Prodr.* i. 76; *Wall. Cat.* 6625; *W. & A. Prodr.* 6; *Thw. Enum.* 5. D. integra, *Thunb. l.c.* 199, t. 18; *DC. l.c.;* Wormia integra, *H. f. & T. Fl. Ind.* 68.

Warmer parts of CEYLON, up to 2000 ft.

A tree; branchlets hairy, soon glabrous. *Leaves* 4–6 by 2–3 in., coriaceous, glabrous, base acute; petiole 1 in. *Flowers* subterminal, 3 in. diam., white; peduncle 2 in. *Petals* obovate. *Stamens* all erect, anthers 2-porose. *Fruit* 1½ in. diam., of 5 carpels.

SECT. II. **Colbertia,** *Salisb.* (genus). *Branchlets* scabrid. *Leaves* deciduous. *Flowers* appearing before the leaves, yellow, axillary or from the scars, solitary or panicled.

6. **D. aurea,** *Sm. Exot. Bot.* t. 92, 93; leaves obovate-crenate, flower solitary 4–5 in. diam., adult sepals glabrous glaucous. *DC. Prodr.* i. 76; *Wall. Cat.* 6624; *H. f. & T. Fl. Ind.* 70. D. ornata, *Wall. Pl. As. Rar.* i. 21, t. 23; *Cat.* 947. D. speciosa, *Griff. Notul.* iv. 703. Colbertia obovata, *Blume Bijd.* 6.

Tropical forests along the base of the HIMALAYA from Bhotan to Nipal. EASTERN PENINSULA, in Pegu, Martaban, Mergui and the Andaman Islands.—DISTRIB. Java to Borneo.

A spreading tree, bark grey. *Leaves* 1 ft., tapering to the base, distantly crenate-toothed, glabrous above, softly pubescent beneath. *Flowers* terminating axillary short shoots; peduncle 1 in. *Sepals* when young villous. *Carpels* 8–12. *Fruit* with the calyx as large as a small apple.

7. **D. pulcherrima,** *Kurz in Journ. As. Soc. Beng.* 1871, 46; leaves broadly obovate sinuate glabrous above, flowers 4 in. diam. solitary or geminate, adult sepals silky.

Tropical forests of PEGU, *Kurz.*

A large tree; bark grey; young parts silky. *Leaves* 9–18 by 6–12 in., orbicular or cordate, rarely narrowed at the base, nerves ending in marginal points, glabrous above, pale and sparsely pilose beneath; petiole 1–2 in., ½-amplexicaul, deeply channelled. *Flowers* on short axillary shoots; peduncles 1½–2 in., silky, ebracteate, *Sepals* elliptic. *Petals* narrow-obovate.—Nearly allied to *D. aurea,* but leaves larger, nerves less close, and petals narrower.

8. **D. scabrella,** *Roxb. Hort. Beng.* 43; *Fl. Ind.* ii. 653; leaves obovate-oblong toothed scabrid above, flowers fascicled $1\frac{1}{2}$–2 in. diam., sepals glabrous. *Wall. Pl. As. Rar.* i. 20, t. 22; *Cat.* 944; *H.f. & T. Fl. Ind.* 70. D. pilosa, *Ham. in Trans. Linn. Soc.* xv. 102 (*not of Roxb.*).

Forests of ASSAM and SILHET, ascending to 3000 ft. in the Khasia hills.

A tree; bark grey; young parts hairy. *Leaves* 6–10 by 4–6 in., obtuse, tomentose beneath; petiole 1–2 in., $\frac{1}{2}$-amplexicaul at the dilated base. *Flowers* 3–5 together, sweet-scented, pedicels 2 in., with scattered bracts near the middle. *Sepals* glabrous. *Carpels* 5–7.

9. **D. parviflora,** *Griff. Notul.* iv. 784; leaves obovate-oblong, scabrid above, margins undulate denticulate, flowers 2–4 rarely solitary $1\frac{1}{2}$–2 in. diam., sepals silky. *Kurz in Journ. As. Soc. Beng.* 1871, 45.

Forests of TENASSERIM, MERGUI, PEGU and the ANDAMAN ISLANDS.

A tall tree; bark grey, rugged; young parts silky or tomentose. *Leaves* 7–12 by 4–5 in., acute or abruptly acuminate, rigidly hirsute or softly tomentose beneath, reticulated between the nerves; petiole 1–$1\frac{1}{2}$ in., pubescent, $\frac{1}{2}$-amplexicaul. *Flowers* on wart-like lateral branchlets; pedicels 1–$1\frac{1}{2}$ in., ebracteolate, tomentose. *Sepals* elliptic, obtuse, silky, two inner less so. *Petals* obovate-spathulate. *Stigmas* 5–8.

10. **D. pentagyna,** *Roxb. Cor. Pl.* i. t. 20; *Fl. Ind.* ii. 652; leaves oblong-lanceolate acute strongly serrate, petiole short broadly winged, flowers umbelled 1 in. diam., sepals glabrous. *Graham Cat. Bomb. Pl.* 2; *W. & A. Prodr.* 5; *H.f. & T. Fl. Ind.* 71. D. augusta *and* D. pilosa, *Roxb. Fl. Ind.* ii. 652. Colbertia Coromandeliana, *DC. Prodr.* i. 75; *Wall. Cat.* 949. C. augusta, *Wall. Cat.* 948.

Forests throughout India, from OUDE and BEHAR to ASSAM, in the WESTERN PENINSULA and PEGU (absent from Ceylon).

A spreading tree; bark grey; branches rough and scarred; young parts very silky. *Leaves* 1–2 by $\frac{1}{2}$–1 ft., subsessile or tapering into a broad $\frac{1}{2}$-amplexicaul petiole 1–2 in. long, young silky pubescent, old glabrous. *Flowers* 5–8; pedicels 1–2 in., ebracteolate. *Sepals* elliptic, glabrous. *Petals* obovate. *Carpels* 5.

11. **D. grandifolia,** *Wall. Cat.* 946; leaves oblong-lanceolate acute serrate, petiole 5–6 in. hardly winged, *H.f. & T. Fl. Ind.* 71.

EASTERN PENINSULA; at Pinang and Malacca.

Very similar to *D. pentagyna*, but leaves softly hairy above, densely tomentose beneath, and petioles 5–6 in. also densely tomentose. The specimens in Wall. Herb. are very imperfect.

12. **D. floribunda,** *H.f. & T. Fl. Ind.* 71; leaves broadly elliptic glabrous above obtuse at both ends subentire, petiole not winged, flowers umbelled about 1 in. diam. Colbertia floribunda, *Wall. Cat.* 950.

EASTERN PENINSULA, Martaban, *Wallich.*

A tree. *Leaves* 18 by 10 in., obtuse at both ends, glabrous above, downy on the nerves beneath; petiole about 3 in., glabrous, ebracteolate.—Two leaves and a truncheon of wood with a few withered flowers are all that represent this species in the Wallichian Herbarium.

ORDER III. **MAGNOLIACEÆ.** (By Hooker f. & Thomson.)

Trees or shrubs, sometimes climbing, often aromatic, wood-tissue with glandular markings. *Leaves* alternate, quite entire or toothed, stipulate or not. *Flowers* axillary and terminal, often showy, white yellow or red, sometimes unisexual. *Sepals* and *petals* very deciduous, hypogynous, arranged in whorls of 3 (in *Euptelea* absent). *Stamens* indefinite, hypogynous, filaments flattened or terete, free or monadelphous; anthers basifixed, adnate cells bursting longitudinally. *Carpels* indefinite, free or partly cohering in one whorl or in several on an elongate axis; styles short or rarely long, stigmatose on the inner surface; ovules 2 or more, or the ventral suture anatropous or amphitropous. *Fruit* of berried or follicular rarely woody indehiscent carpels, which are sometimes arranged in a cone. *Seeds* solitary or few, sometimes pendulous from a long funicle, testa single and crustaceous, or double, the outer fleshy; albumen granular or fleshy and oily; embryo minute, cotyledons spreading, radicle short blunt next the hilum.—DISTRIB. Chiefly natives of the tropical and temperate Asiatic mountains, and United States, a few are Australian; species about 70.

TRIBE I. **Trochodendreæ.** Perianth absent.

1. EUPTELEA.

TRIBE II. **Wintereæ.** *Stipules* 0. *Perianth* double. *Carpels* in one whorl.

2. ILLICIUM.

TRIBE III. **Magnolieæ.** Erect trees or shrubs. *Stipules* conspicuous, convolute and sheathing the young foliage, deciduous.

Gynophore sessile.	
Carpels of fruit indehiscent, deciduous	3. TALAUMA.
Carpels of fruit dehiscing dorsally. Ovules 2.	4. MAGNOLIA.
Carpels of fruit dehiscing dorsally. Ovules 6 or more	5. MANGLIETIA.
Gynophore stalked	6. MICHELIA.

TRIBE IV. **Schizandreæ.** Climbing shrubs. *Leaves* exstipulate.

Carpels of fruit spiked	7. SCHIZANDRA.
Carpels of fruit capitate	8. KADSURA.

1. **EUPTELEA,** Sieb. and Zucc.

A shrub. *Leaves* alternate, deciduous, toothed; petiole sheathing; stipules 0. *Flowers* pedicelled, polygamo-diœcious. *Sepals* and *petals* 0. *Stamens* 15–20, in one whorl. *Carpels* as many as the stamens, pedicelled, obovate, much compressed, winged, indehiscent; stigma sessile, decurrent from the tip to opposite the insertion of the ovule. *Fruit* of indehiscent dry flat winged 1–4-seeded carpels. *Seeds* closely packed; testa hard, coriaceous; albumen granular; embryo minute.—DISTRIB. 2 species, the following and a Japanese.

1. **E. pleiosperma,** *H.f. & T. in Proc. Linn. Soc.* vii. 240, t. 2.

MISHMI HILLS, near the top of Mount Thumathaga, *Griffith*.

A shrub; branches smooth, spotted with white; buds lateral and terminating short lateral shoots, enclosed in hard black shining scales. *Leaves* 3–4 by 2–3 in., broad elliptic, acutely toothed, acute at both ends, glabrous, pale beneath, nerves very oblique; petiole 1½ in., channelled above, dilated at the base.—Specimens imperfect.

2. **ILLICIUM,** Linn.

Evergreen aromatic shrubs or small trees. *Leaves* quite entire, pellucid-dotted. *Flowers* 2-sexual, solitary or fascicled, yellow or purplish. *Sepals*

3–6. *Petals* 9 or more, 3–many-seriate. *Stamens* indefinite, filaments thick; anthers adnate, introrse. *Ovaries* indefinite, 1-seriate, 1-ovuled; style subulate, recurved. *Fruit* of spreading compressed hard follicles. *Seeds* compressed, testa hard shining, albumen fleshy.—DISTRIB. N. America, China, Japan, India; species about 5.

1. **I. Griffithii,** *H.f. & T. Fl. Ind.* 74; leaves elliptic-lanceolate, perianth-segments about 24.

Copses in BHOTAN and the KHASIA HILLS, alt. 4–5000 ft., *Griffith*, &c.

A shrub, branches angular, glabrous. *Leaves* 2–4 by 1–2 in., acute at both ends, coriaceous, shining. *Flowers* 1½ in. diam. *Sepals* 6, orbicular. *Petals* 18, outer oval, inner smaller and narrower. *Carpels* with a thin fleshy epicarp, woody endocarp, and short subulate incurved beak.—Specimens in bud and fruit only,

2. **I. majus,** *H.f. & T.;* leaves obovate-oblong or lanceolate, perianth-segments about 16.

TENASSERIM, on the Thoung Gain range, alt. 5500 ft., *Lobb.*

A shrub, 30 ft. *Leaves* 4–6 by 1½–2 in., sharply acuminate, coriaceous, glabrous, shining above; petiole 1 in. *Flowers* pink. *Pedicels* 1–3 in., subterminal, solitary or fascicled. *Sepals* and *petals* orbicular, ciliate, inner broad-oval. *Filaments* short, broader than the oblong anthers. *Ovaries* spreading. *Fruit* unknown.

3. TALAUMA, Juss.

Trees or shrubs. *Leaves* and inflorescence of *Magnolia*. *Sepals* 3. *Petals* 6 or more, in 2 or more whorls. *Stamens* very numerous, many-seriate; anthers linear, introrse. *Gynophore* sessile. *Ovaries* indefinite, 2-ovuled, spiked or capitate; stigmas decurrent. *Carpels* woody, separating from the woody axis at the ventral suture, and leaving the seeds suspended from the latter by an elastic cord. *Seeds* of *Magnolia.*—DISTRIB. Tropics of E. Asia and S. America, and in Japan; species about 15.

1. **T. Hodgsoni,** *H.f. & T. Fl. Ind.* 74; leaves obovate-oblong acute or obtuse glabrous, ovaries glabrous, fruit ovoid, carpels sharply beaked. *H.f. Ill. Him. Pl.* t. 6.

Forests of the SIKKIM HIMALAYA and of the KHASIA HILLS, alt. 4–5000 ft.

A lofty evergreen tree. *Leaves* 8–20 by 4–9 in., coriaceous, petiole 1–2 in. *Flowers* white, odorous; peduncle short, thick; buds subglobose, 2–3 in. diam. *Fruit* 4–6 in.; carpels 1½ by 1 in.; pits of the axis deep, nearly square.

2. **T. Rabaniana,** *H.f. & T. Fl. Ind.* 75; leaves lanceolate glabrous, ovaries glabrous, fruit ovoid, carpels shortly beaked. Liriodendron liliifera, *Roxb. Fl. Ind.* ii. 654.

Forests of the KHASIA HILLS, alt. 4000 ft., *H. f. & T.*

A lofty tree. *Leaves* 8–12 by 2–4 in.; petiole 1 in. *Fruit* 4–6 in., longer than broad; pits of the axis shallow, elongated.

3. **T. lanigera,** *H.f. & T.;* leaves lanceolate acute at both ends, glabrous, ovaries densely woolly, ripe fruit unknown.

EASTERN PENINSULA, *Griffith.*

A tree. *Leaves* 12 by 5 in.; petiole 1 in., thickened below. *Flowers* large, odorous; peduncle densely tomentose. *Sepals* 3, tomentose, at length glabrate. *Petals* about 8. oblong, fleshy, exceeding the sepals. *Carpels* (immature) densely woolly, beak glabrous.

4. **T. mutabilis,** *Blume Fl. Jav. Magnol.* 24, t. 10–12; leaves elliptic or lanceolate acuminate usually pilose or downy beneath, fruit ovoid;

carpels 9–12 coriaceous tubercled, beak short recurved. *H. f. & T. Fl. Ind.* 74. Manglietia Candollei, *Wall. Cat.* 6497 (*not of Blume*).

EASTERN PENINSULA, from Moulmein to Pinang.—DISTRIB. Java.

A shrub, 6–9 ft. (Blume) or tree: bark brown. *Leaves* 6–12 by 2–4 in., glabrous above, rarely so beneath, base acute; petiole 1–2 in., thickened below. *Flowers* large, white; peduncle stout, silky or woolly. *Sepals* 3, 1–2 in., oval, thick, greenish. *Petals* 6, obovate. *Fruit* 2 in.

4. **MAGNOLIA**, Linn.

Trees or shrubs. *Leaves* evergreen or deciduous; buds enveloped in the convolute stipules, which are connate in pairs. *Flower* large, terminal. *Sepals* 3. *Petals* 6–12, 2–4-seriate. *Stamens* numerous, many-seriate, filaments flat; anthers adnate, introrse. *Gynophore* sessile. *Carpels* many, imbricated on a long axis, 2-ovuled, persistent; stigmas decurrent on the ventral suture. *Fruit* an elongated axis, with persistent adnate 1–2-seeded dorsally dehiscing follicles. *Seeds* pendulous from the carpels by a long cord; outer walls of testa fleshy; albumen oily.—DISTRIB. Temp. N. America, temp. and trop. E. Asia and Japan; species about 15.

1. **M. Campbellii,** *H. f. & T. Fl. Ind.* 77; leaves deciduous elliptic ovate or oblong acute or acuminate membranous, flowers appearing before the leaves white or rose, carpels obtuse not beaked. *H. f. Ill. Him. Pl.* t. 4, 5. *Griff. Ic.* iv. t. 656.

EASTERN HIMALAYA, forests of Sikkim and Bhotan, alt. 8–10,000 ft.

A lofty tree; branches black. *Leaves* 4–12 by 2–4 in., glabrous above, glaucous pubescent or silky beneath, base cordate rounded or oblique; petiole 1 in. *Flowers* 6–10 in. diam. *Petals* 9–12. *Fruit* 6–8 in.

2. **M. globosa,** *H. f. & T. Fl. Ind.* 77; leaves deciduous? ovate acute or obtuse shortly mucronate glaucous beneath, buds globose appearing with the leaves, carpels shortly beaked.

Inner ranges of the SIKKIM HIMALAYA, alt. 9–10000 ft.

A small tree; branches brown, young tomentose, old glabrous. *Leaves* 5–9 by 3–6 in., nerves beneath tomentose. *Flowers* 4–5 in. diam., white, odorous; buds 1½ in. diam. *Petals* 6. *Fruit* 2–3 in. long.

3. **M. Griffithii,** *H. f. & T.;* leaves persistent oblong acute pale beneath, buds oblong appearing with the leaves, carpels obtuse not beaked.

Forests of UPPER ASSAM, near Sadya, *Griffith.*

An evergreen tree; young branches and buds silky tomentose, finally glabrate. *Leaves* 10–14 by 5–6 in., coriaceous, glabrous above, nerves a little rough beneath; petiole ½ in. *Flower-buds* 2 in., enclosed in silky bracts. *Carpels* 1–2-seeded.—The number of ovules is doubtful, and the plant may be a *Manglietia.*

4. **M. sphenocarpa,** *Roxb. Cor. Pl.* iii. t. 266; leaves evergreen oblong obtuse or subacute glabrous on both sides or puberulous beneath, buds globose appearing with the leaves, carpels very long-beaked. *Wall. Cat.* 975; *H. f. & T. Fl. Ind.* 78. Liriodendron grandiflorum, *Roxb. Fl. Ind.* ii. 653. Michelia macrophylla, *Don Prodr.* 226.

TROPICAL HIMALAYAN forests, from Nipal to Assam, KHASIA HILLS, and CHITTAGONG, alt. 3000 ft.

Evergreen; young parts hoary, at length glabrate. *Leaves* 8–16 by 3–6 in., tapering to the base, thick, coriaceous; petiole 1–2 in. *Flowers* white, fragrant; buds 2 in. diam. *Petals* 6, oval, fleshy. *Fruit* 8–16 in.; beak of carpels compressed, 1 in or more.

There is an undescribed *Magnolia* or *Manglietia* in Herb. Hook. from Bhotan (*Booth*) too incomplete for description.

5. **MANGLIETIA,** Blume.

Trees; foliage and inflorescence of *Magnolia*. *Sepals* 3. *Petals* 6 or more, 2- or more-seriate. *Stamens* very numerous, many-seriate; anthers linear, adnate, introrse. *Gynophore* sessile. *Ovaries* many, cohering in an ovoid head; stigma decurrent on the ventral suture; ovules 6 or more. *Fruit* ovoid, head of carpels persistent dehiscing dorsally. *Seeds* as in *Magnolia*.—Distrib. Mountains of tropical Asia; species 5.

1. **M. insignis,** *Blume Fl. Jav. Magnol.* 23; leaves lanceolate acute or acuminate, fruit a dense oblong spike of carpels. *H. f. & T. Fl. Ind.* 76. Magnolia insignis, *Wall. Tent. Fl. Nep.* t. 1; *Pl. As. Rar.* ii. t. 182; *Cat.* 973.

Nipal, alt. 6–10,000 ft. Khasia hills, alt. 3–6000 ft.

A lofty tree, wholly glabrous except a few brown hairs on the tips of the bud-scales. *Leaves* 4–8 by 1–2½ in., coriaceous, shining above, pale beneath, petiole ¾–1 in. *Flowers* odorous, pale pink; buds 2 in., ovoid-oblong. *Petals* 9. *Fruit* 3–4 in., bright-purple when fresh.

Var. 1. latifolia; leaves 4–6 by 2–2½ in., elliptic-lanceolate acute.

Var. 2. angustifolia; leaves 6–8 by 1–2 in., lanceolate acuminate.

2. **M. Caveana,** *H. f. & T. Fl. Ind.* 76; leaves obovate-oblong obtuse or mucronate, fruit an ovoid or subglobose spike of carpels.

Forests of the Khasia hills, alt. 2–3000 ft., *H. f. & T.*

A lofty tree, glabrous everywhere. *Leaves* 8–10 by 3–4 in., coriaceous, glaucous beneath, reticulated when dry; petiole 2 in. *Flowers* unknown. *Carpels* rounded at the back. *Seeds* 2–6.

6. **MICHELIA,** Linn.

Trees. *Leaves* as in *Magnolia*. *Flowers* axillary, solitary (terminal in *M. Cathcartii*). *Sepals* and *petals* similar, 9–15 or more, 3- or more-seriate. *Stamens* as in *Magnolia*. *Gynophore* stalked. *Carpels* in a loose spike, stigma decurrent; ovules 2 or more. *Fruit* a lax or dense elongate spike of coriaceous dorsally dehiscing carpels. *Seeds* of *Magnolia*.—Distrib. About 12 species; temp. and trop. Mts. of India.

* *Flowers terminal.*

1. **M. Cathcartii,** *H. f. & T. Fl. Ind.* 79; leaves oblong-lanceolate acuminate, nerves hairy on both surfaces, perianth-segments 9. *H. f. Ill. Him. Pl.* t. 7.

Temperate forests of the Sikkim Himalaya, alt. 5–6000 ft.

A lofty tree; young branches densely silky. *Leaves* 4 by 1½ in., thin, subcoriaceous, pale beneath; petiole ½ in. *Flowers* 1 in. diam., white. *Sepals* and *petals* oblong, inner gradually smaller. *Carpels* sessile, densely imbricate; rachis 2–4 in.

** *Flowers axillary. Ovules* 3 *or more* (*see also* 8, nilagirica).

2. **M. Champaca,** L.; leaves ovate-lanceolate tapering to a long point, flowers yellow, segments of perianth 15–20, ovaries pubescent. *DC. Prodr.* i. 79; *Wall. Cat.* 969 (*except K*); *Roxb. Fl. Ind.* ii. 656; *W. & A. Prodr.* i. 6; *Wight Ill.* i. 13; *Blume Fl. Jav. Magnol.* t. 1; *H. f. & T. Fl. Ind.* 79. M. rufinervis, *DC. l.c.* 79; M. Doldsopa, *Ham. ex DC. l.c.; Don Prodr.* 226; *Wall. Tent. Fl. Nep.* t. 3; *Cat.* 971; M. aurantiaca, *Wall. Cat.* 6492; *Plant. As. Rar.* t. 147. M. Rheedii, *Wight Ill.* i. 14, t. 5, f. 6.

Commonly cultivated, but wild in the forests of the Temperate Himalaya, from Nipal eastward; and in Pegu, Tenasserim, the Nilghiris and Travancor.—Distrib. Java (*Champi*).

A tall tree; branchlets pubescent. *Leaves* 8–10 by 2½–4 in., shining above, pale and glabrous or puberulous beneath; petiole 1–1½ in. *Flowers* 2 in. diam., pale yellow or orange, very fragrant; peduncle short; buds silky. *Sepals* oblong, acute. *Petals* linear. *Fruit* 3–4 in., carpels subsessile.

3. **M. excelsa,** *Blume Fl. Jav. Magnol.* 9; leaves oblong or oblong-lanceolate acute silky-brown beneath, flowers white, segments of perianth about 12, ovaries pubescent. *Wall. Cat.* 6494; *Wight Ill.* i. 14; *H. f. & T. Fl. Ind.* 80; *Griff. Ic.* iv. 655. Magnolia excelsa, *Wall. Tent. Fl. Nep.* t. 2.

Temperate Himalaya, alt. 5000 ft., from Nipal to Bhotan, and in the Khasia hills.

A lofty tree; young parts softly brown-hairy. *Leaves* 5–8 by 2–3 in., acute, glabrous above; petiole 1 in. *Flowers* 4–5 in. diam.; buds 2 in., silky-brown. *Sepals* obovate. *Petals* gradually narrower. *Fruit* 5–8 in.; carpels subsessile, rather distant.

4. **M. lanuginosa,** *Wall. Tent. Fl. Nep.* 8, t. 5; *Cat.* 6493; leaves oblong or lanceolate, glabrous above white and tomentose beneath, flowers white, segments of perianth about 18, ovaries densely woolly. *H. f. & T. Fl. Ind.* 80. M. velutina, *DC. Prodr.* i. 79.

Temperate Himalaya, alt. 5–7000 ft., from Nipal to Bhotan, and in the Khasia hills.

A small or large tree; young parts densely white- or grey-tomentose. *Leaves* 6–10 by 2–3½ in.; petiole ½ in. *Flowers* 3–4 in. diam.; buds 1½ in. *Sepals* narrow-obovate, obtuse. *Inner petals* narrower, acute. *Fruit* 4–5 in.; carpels obovate, stalked, distant. —Wallich describes this as a tall tree flowering in spring. In Sikkim it forms a large bush, flowering in autumn.

5. **M. Kisopa,** *Ham.; DC. Prodr.* i. 79; leaves lanceolate or oblong-lanceolate glabrous, flowers pale yellow, segments of perianth about 12, ovaries densely pubescent. *Wall. Tent. Fl. Nep.* t. 4; *Cat.* 970; *Don Prodr.* 226; *H. f. & T. Fl. Ind.* 81.

Temperate Himalaya, alt. 5–7000 ft., from Nipal to Kumaon.

A tall tree; bark grey, young parts clothed with appressed grey pubescence, soon glabrous. *Leaves* 5–6 by 1½–2 in., acute or acuminate, glabrous on both surfaces; petiole 1 in. *Flowers* ¾–1 in. diam.; buds puberulous. *Sepals* narrow-obovate. *Petals* scarcely narrower than the sepals. *Fruit* 3–4 in.; carpels sessile.

*** *Flowers axillary. Ovules 2, superposed.*

6. **M. oblonga,** *Wall. Cat.* 972; leaves obovate-oblong glabrous glaucous beneath, flowers white, segments of perianth about 12. *H. f. & T. Fl. Ind.* 81; M. lactea, *Wall. Cat.* 6491.

Forests of the Khasia hills and Assam.

A tree; branches glabrous. *Leaves* 4–6 by 2–2½ in., obtusely acuminate; petiole ½–1 in. *Flower-buds* about 1 in., glabrous. *Sepals* 1½ in., narrow-obovate. *Petals* lanceolate. *Carpels* sessile.—An imperfectly known species.

7. **M. punduana,** *H. f. & T. Fl. Ind.* 81; leaves oblong abruptly acuminate glabrous, flowers white, segments of perianth about 9, ovaries densely pubescent. Magnolia punduana, *Wall. Cat.* 974.

Forests of the Khasia hills, alt. 3–5000 ft.

A tall tree; young parts brown-silky, soon glabrate. *Leaves* 4–6 by 2 in., base acute or obtuse; petiole ¼–¾ in. *Flowers* 1½–2 in. diam.; buds ¾–1 in., silky. *Segments of perianth* obovate, outer obtuse, inner acute. *Fruit* 3–4 in.; carpels sessile.

8. **M. nilagirica,** *Zenk. Plant. Ind.* t. 20; leaves oblong elliptic- or obovate-lanceolate acute at both ends or tip mucronate glabrous or puberulous only on the nerves beneath, flowers white, segments of perianth 9–12, ovules 2 or 4–5. *Wight Ill.* i. 14; *Ic.* t. 938; *H. f. & T. Fl. Ind.* 82; *Thwaites Enum.* 5. M. Pulneyensis, *Wight Ill.* i. 14, t. 5 (*except figs.* 5 and 6).

Higher mountains, alt. 5–6000 ft., of the WESTERN PENINSULA (var. 1) and of CEYLON (var. 2).

A tall tree, or shrub at high elevations, young parts silky. *Leaves* 2–4 in. *Flowers* 3–4 in. diam.; buds ½–1½ in., ovoid, pubescent. *Perianth-segments* obovate, inner acute. *Fruit* 2–3 in.; carpels sessile.—There is some confusion in the descriptions of the Ceylon and Nilghiri plants. Zenker describes *M. nilagirica* as 1-ovuled; Wight, (Illust.) repeats this, but (Icones) figures 2 ovules and describes 4. Wight further describes (Illustr.) *M. Walkeri* as 2-ovuled, and *ovalifolia* as 3-ovuled, whilst under *glauca* he makes no mention of the ovules. His *M. Pulneyensis* is figured with yellow flowers, and 4 ovules, and may be *M. Champaca.*—The following varieties are possibly species:—

VAR. 1. WIGHTII; a tree, leaves 3–5 by 1½–2 in. elliptic green below, segments of perianth usually 12, ovules 4–5.—M. ovalifolia, *Wight Ill.* i. 13.

VAR. 2. WALKERI; leaves 2–3 by 1–1½ in. oblong or obovate-oblong glaucous below, segments of perianth usually 9, ovules 2, superposed.—*M. Walkeri* and *M. glauca*, Wight Ill. i. 13, 14.

7. SCHIZANDRA, Michaux.

Climbing glabrous shrubs. *Leaves* exstipulate. *Flowers* unisexual, white, yellow or reddish, axillary, or in the axils of scales near the base of short lateral leafy branches. *Sepals* and *petals* 9–12, imbricate in about 3 series. ♂ *Stamens* 5–15 or more, in a spiral series, filaments very short, free or subconnate, often fleshy; anthers free or subimmersed in a fleshy head of confluent filaments, cells small, remote. ♀ *Ovaries* many, densely imbricated; stigma sessile; *ovules* 2. *Fruit* a slender spike of globose indehiscent fleshy 1-seeded carpels. *Seeds* 1–2, suspended, albumen fleshy, testa crustaceous; embryo minute.—DISTRIB. U. States, mountains of temperate and tropical India and Java; species about 6.

* *Filaments monadelphous below, free above.*

1. **S. grandiflora,** *H. f. & T.*; leaves ovate or oblong-lanceolate acuminate distantly toothed, flowers 1 in. diam., fruit 6–9 in., carpels scarlet fusiform on a cylindric fleshy axis. Sphærostema grandiflorum, *H. f. & T. Fl. Ind.* 84. Kadsura grandiflora, *Wall. Tent. Fl. Nep.* t. 14; *Cat.* 4985 *A in part.*

TEMPERATE HIMALAYA, from Simla to Bhotan, alt. 6–10,000 ft.

A woody glabrous climber. *Leaves* 3–6 by 1–2 in., rather fleshy, base acute, pale beneath; petiole 1–1½ in. *Flowers* solitary, pinky-white, odorous; pedicel 1–2 in. *Filaments* cylindric above; anthers ovoid, connective thickened, cells lateral or subextrorse.

2. **S. elongata,** *H. f. & T.*; leaves ovate acute or acuminate minutely cartilaginous-toothed, flowers ⅔ in. diam., fruit 2–3 in., carpels on a slender axis. Sphærostema elongatum, *Blume Fl. Jav. Schiz.* t. 5; *H. f. & T. Fl. Ind.* 85. S. grandiflorum, *Wall. Cat.* 4983, *A in part*, & *C.*

TEMPERATE HIMALAYA, from Nipal to Sikkim, alt. 5–6000 ft.; KHASIA HILLS.—DISTRIB. Java.

A woody climber; branches slender. *Leaves* 3–4 by 1½–2 in., pale or glaucous beneath; petiole ½–1 in. *Flowers* fascicled or solitary, ½–¾ in. diam., yellowish; pedicels 1–1½ in., slender. *Stamens* as in *S. grandiflora.*—Confounded with *S. grandiflora* by Wallich (under 4985), but more slender, flowers smaller. The fruit is not so stalked as in Blume's figure, but we believe this to be a variable character.

** *Anthers sessile in cavities of the fleshy head of filaments.*

3. **S. propinqua,** *H. f. & T.;* leaves ovate-lanceolate serrate-toothed, flowers small, pedicels long, fruit 6 in. long, axis fleshy. Sphærostema propinquum, *Blume Fl. Jav. Schiz.* 16; *Wall. Cat.* 4986; *H. f. & T. Fl. Ind.* 85. Kadsura propinqua, *Wall. Tent. Fl. Nep.* 15.

HIMALAYA, from Nipal to Kumaon, alt. 4–6000 ft.

A woody climber. *Leaves* 3–5 by 1½ in., base rounded or cuneate; petiole ½ in. *Flowers* small, yellow or orange, solitary or fascicled; buds ⅓–½ in. diam.; pedicels ½ in., bracteolate. *Anthers* slightly protruded. *Carpels* as in *S. grandiflora.*

4. **S. axillaris,** *H. f. & T.;* leaves lanceolate or oblong-lanceolate tapering to a fine point, entire or remotely toothed, flowers ½ in. diam., pedicels very short bracteolate, fruit 1–2 in. long. Sphærostema axillare, *Blume Fl. Jav. Schiz.* t. 3; *H. f. & T. Fl. Ind.* 86.

KHASIA HILLS, alt. 4–5000 ft.—DISTRIB. Java.

A slender climber. *Leaves* 3 by 1½–1¾ in., base cuneate or rounded; petiole ½ in. *Flowers* dull scarlet, axillary; bracteoles imbricating. *Stamens* as in *S. propinqua. Carpels* small.

8. **KADSURA,** Kæmpfer.

Characters of *Schizandra*, but ripe carpels arranged in a globose head, ovules sometimes 4.—DISTRIB. temp. and subtrop. Asia; species about 7.

1. **K. Roxburghiana,** *Arn. in Jard. Mag. Zool. & Bot.* ii. 546; leaves ovate or oblong acute or acuminate, filaments connate in a column. *H. f. & T. Fl. Ind.* 83. Kadsura japonica, *Wall. Tent. Fl. Nep.* t. 12; *Cat.* 4987 *A, B (partly), not of Jussieu.* Uvaria heteroclita. *Roxb. Fl. Ind.* ii. 663.

SUBTROPICAL FORESTS of SIKKIM, ASSAM, SILHET, and the KHASIA HILLS, ascending to 5000 ft.

A stout rambling climber; bark very rough. *Leaves* 3–6 by 1½–3 in., fleshy; petiole ½ in. *Flowers* ½ in diam.; pedicels ¾–1 in., stout, bracteolate to or below the middle. *Outer filaments* short, free above, inner wholly connate. *Ovules* 2. *Fruit* 1–2 in. diam. *Carpels* many, as large as a bean, base cuneate, top rounded.

2. **K. Wightiana,** *Arn. l.c.* ii. 546; leaves broadly ovate acute or obtuse, filaments free, ovules usually 4. *H. f. & T. Fl. Ind.* 84; *Thwaites Enum.* 5.

Mountains of MALABAR, *Wight*, and of CEYLON, alt. 2–3000 ft.

A woody climber. *Leaves* 2–3 by 1–2 in., pale beneath, base cuneate. *Flowers* ½ in. diam., pale yellow-green; pedicels 1–2 in., stout, with several bracteoles. *Fruit* like *K. Roxburghiana.*

There is in Herb. Kew. an imperfect specimen of a Malacca *Kadsura* collected by Griffith (see *Notul.* iv. 714, *Ic.* iv. t 651, f. 1 & 2); it may be *K. scandens*, Blume, distinguished by its mucronate fruit.

ORDER IV. **ANONACEÆ.** (By Hooker f. & Thomson.)

Trees or shrubs, often climbing and aromatic. *Leaves* alternate, exstipulate, simple, quite entire. *Flowers* 2- rarely 1-sexual. *Sepals* 3, free or connate, usually valvate. *Petals* 6, hypogynous, 2-seriate, or the inner absent. *Stamens* many, rarely definite, hypogynous, closely packed on the torus, filaments short or 0; anthers adnate, cells extrorse or sublateral, connective produced into an oblong dilated or truncate head. *Ovaries* 1 or more, apocarpous, very rarely (*Anona*) syncarpous with distinct stigmas, style short or 0; ovules 1 or more. *Fruit* of 1 or more sessile or stalked 1- or many-seeded usually indehiscent carpels. *Seeds* large; testa crustaceous or coriaceous; albumen dense, ruminate, often divided almost to the axis into 4 series of horizontal plates; embryo small or minute, cotyledons divaricating.—DISTRIB. Tropics of the Old World chiefly; genera about 40 with 400 species, the determination of which is exceedingly difficult.

TRIBE I. **Uvarieæ.** *Petals* 2-seriate, one or both series imbricate in bud. *Stamens* many, close-packed; their anther-cells concealed by the overlapping connectives. *Ovaries* indefinite.

Flowers 1-sexual; ovules many; torus conical . . . . 1. STELECHOCARPUS.
Flowers 2-sexual; ovules many, rarely few; torus almost flat . 2. UVARIA.
Flowers 1–2-sexual; ovule solitary . . . . 3. ELLIPEIA.

TRIBE II. **Unoneæ.** *Petals* valvate or open in bud, spreading in flower, flat or concave at the base only, inner subsimilar or 0. *Stamens* many, close-packed, their anther-cells concealed by the overlapping connectives. *Ovaries* indefinite.

* *Petals conniving at the concave base and covering the stamens and ovaries.*

Ovaries 1–3, many-ovuled; peduncles not hooked . . . . . 4. CYATHOCALYX.
Ovaries many, 2-ovuled; peduncles hooked . . . . 5. ARTABOTRYS.
Ovaries many; ovules 4 or more; peduncles straight . . . 6. DREPANANTHUS.

** *Petals flat; spreading from the base.*

Ripe carpels indehiscent.
  Ovules many, 2 seriate: petals lanceolate . . . . 7. CANANGA.
  Ovules many, 2 seriate; petals broad-ovate . . . . . . 8. CYATHOSTEMMA.
  Ovules 2–6, 1-seriate on the ventral suture . . . . 9. UNONA.
  Ovules 1–2, basal or subbasal . . . . 10. POLYALTHIA.
Ripe carpels follicular . . . . 11. ANAXAGOREA.

*** *Inner petals valvate, tip incurved.*

12. POPOWIA.

TRIBE III. **Mitrephoreæ.** *Petals* valvate in bud, outer spreading; inner dissimilar, concave, connivent, arching over the stamens and pistil. *Stamens* many, close-packed, anther-cells concealed by the overlapping connectives. *Ovaries* indefinite.

* *Inner petals not clawed.*

Inner petals smaller than the outer . . . . 13. OXYMITRA.
Inner petals much larger than the outer . . . . 14. PHÆANTHUS.

** *Inner petals clawed, usually smaller than the outer.*

Ovules 1–2, near the base of the ovary . . . . 15. GONIOTHALAMUS.
Ovules many . . . . 16. MITREPHORA.

TRIBE IV. **Xylopieæ.** *Petals* valvate in bud, thick and rigid, connivent, inner similar but smaller, rarely 0. *Stamens* many, close-packed, anther-cells concealed by the produced connectives. *Ovaries* indefinite.

Ovules solitary; fruit fleshy, of many connate carpels . . 16.* ANONA.
Ovules 2–∞; outer petals broad; torus convex . . . . . . 17. MELODORUM.
Ovules 2–∞; outer petals narrow; torus flat or concave . . 18. XYLOPIA.

Tribe V. **Miliuseæ.** *Petals* imbricate or valvate in bud. *Stamens* often definite, loosely imbricate, anther-cells not concealed by the overlapping connectives. *Ovaries* solitary or indefinite.

* *Ovaries indefinite.*

Petals valvate, inner largest; ovules definite	19. Miliusa.
Petals valvate, inner largest; ovules indefinite	20. Saccopetalum.
Petals valvate, subequal; ovules 4–8	21. Alphonsea.
Petals valvate, inner shortest; ovules 2–4	22. Orophea.
Petals imbricate, subequal; ovules 2–8	23. Bocagea.

** *Ovaries solitary.*

Outer petals valvate, inner imbricate	24. Kingstonia.
All the petals valvate	25. Lonchomera.

1. STELECHOCARPUS, Blume.

A tree. *Leaves* coriaceous. *Flowers* diœcious, fascicled, axillary or on the old wood. *Sepals* 3, small, elliptic or orbicular, imbricate. *Torus* conical. *Stamens* indefinite, connective dilated, truncate. *Ovaries* indefinite, ovoid; stigma sessile; ovules 6 or more. *Ripe carpels* large, berried, globose, 4–6-seeded.—Distrib. Species 1 or 2, Malayan.

1. **S. Burahol,** *Blume Fl. Jav. Anon.* 48, t. 23 & 25 C.; leaves oblong-lanceolate acute or acuminate glabrous. *H. f. & T. Fl. Ind.* 95.

Singapore, *Lobb*.—Distrib. Java.

A tall tree; branches black, glabrous. *Leaves* 5–8 by 1½–3 in., base acute; petiole ½ in. ♀ *flowers* many, 1 in. diam.; ♂ much smaller; pedicels with scaly bracteoles, of ♂ 1 in., slender, of ♀ 2–3 in., stout, clavate, bracteolate below the middle. We collected a similar plant, but flowerless, near Chittagong.

2. UVARIA, Linn.

Scandent or sarmentose shrubs, usually stellately pubescent. *Flowers* terminal or leaf-opposed, rarely axillary, cymose fascicled or solitary, yellow purple or brown. *Sepals* 3, often connate below, valvate. *Petals* 6, orbicular oval or oblong, imbricate in 2 rows, sometimes connate at the base. *Stamens* indefinite; top of connective ovoid-oblong truncate or subfoliaceous. *Torus* depressed, pubescent or tomentose. *Ovaries* indefinite, linear-oblong; style short, thick; ovules many, 2-seriate, rarely few or 1-seriate. *Ripe carpels* many, dry or berried, few or many-seeded.—Distrib. Many tropical Asiatic and a few African species.

Sect. I. Outer stamens flat, subfoliaceous, often imperfect.

* Peduncles 1–2-flowered, leaf-opposed, rarely terminal (2–4-flowered in 3, *dulcis* and 7, *Lobbiana*).

a. Leaves below and buds appressed tomentose.

1. **U. purpurea,** *Blume Bijd.* 11: *Fl. Jav. Anon.* 13, t. 1 & 13 *A*; leaves cuneate- or oblong-lanceolate acute or acuminate cordate, stellate tomentose beneath, buds tomentose enclosed in 2 large bracts, carpels oblong or cylindric mucronate tomentose, dorsally 2-keeled. *Wall. Cat.* 6485, *excl. E. & G.*; *H. f. & T. Fl. Ind.* 95. U. grandiflora, *Roxb. Fl. Ind.* ii. 665; *Wall. Pl. As. Rar.* ii. t. 121; *Wight & Arn. Prodr.* 9. Unona grandiflora, *DC. Prodr.* i. 90.

From Pegu, *Wallich*, to Singapore, *Lobb*, and Penang, *Phillips.*—Distrib. Eastward to the Philippines.

Shrubby, sarmentose; young parts stellately pubescent. *Leaves* 6–12 by 2–4 in., tapering downwards from above the middle, young pubescent above, soon glabrous and shining; nerves many, parallel, close-set near the petiole, which is ¼–⅓ in. *Flowers* 3–3 in. diam., rarely geminate, terminal or leaf-opposed, purple, odorous; bracts orbicular, deciduous; peduncle 1–1½ in. *Sepals* ovate, acute. *Carpels* many, stalked, subtorulose; stalk 1–1½ in.

2. **U. Hamiltoni,** *H. f. & T. Fl. Ind.* 96; leaves oblong-obovate long acuminate pubescent above tomentose beneath, buds tomentose, peduncle 1-bracteolate, carpels subglobose or broad ovoid tomentose not keeled. *Wall. Cat.* 6485, *E.*

Forests of the Sikkim Terai, Behar near Monghir, and Assam, *Hamilton.*

Shrubby, sarmentose or scandent; branches rough, tomentose. *Leaves* 5–8 by 2–3½ in., tapering to the rounded or cordate base; petiole ⅙–⅓ in. *Flowers* 2 in. diam., solitary or geminate, leaf-opposed; pedicel 1 in., tomentose. *Sepals* connate below, short, broad, obtuse, mucronate. *Petals* broad-oval, densely tomentose on both surfaces. *Carpels* many, ¾–1 in., transversely grooved when dry; stalk 1 in.

3. **U. dulcis,** *Dunal Anon.* 90 t. 13; leaves oval or oblong subacute puberulous above, woolly beneath, buds globose tomentose, peduncle with several bracteoles about the middle short 1–4-flowered. *DC. Prodr.* i. 88; *H. f. & T. Fl. Ind.* 98. U. Javana, *Dunal l. c.* 91; *Blume Fl. Jav. Anon.* t. 3.

Malacca, *Griffith, Maingay;* Tenasserim, *Brandis.*

A large woody climber; young branches densely tomentose. *Leaves* 3–5 by 1½–2½ in., base rounded or subcordate, slightly repand; petiole ⅙–¼ in. *Flowers* 2 in. diam., subumbellate, greenish, odorous; peduncle ¼–½ in., leaf-opposed, short, woody; bracts several; pedicels bracteolate about the middle. *Petals* oblong, subacute, tomentose on both sides.—Allied to *U. macrophylla.*

4. **U. sphenocarpa,** *H. f. & T. Fl. Ind.* 99; leaves narrow-obovate or cuneate-oblong, shining above stellate-tomentose beneath, peduncle 1-flowered, bracts orbicular scaly imbricate, carpels obovate-cuneate sessile warted. *Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 80.

Forests of Ceylon, ascending to 15,000 ft., *Walker*, &c.

A large shrub, climbing? *Leaves* 3–5 by 1¼–2¼ in., shortly petioled, long-acuminate, base obtuse or retuse, above sparsely hairy, midrib tomentose. *Flowers* ⅓–½ in. diam., greenish-brown; peduncles ½ in., leaf-opposed. *Petals* broadly oblong, tomentose. *Carpels* 1 in. diam., obovate-cuneate.

β. *Leaves buds and carpels with loose spreading hairs.*

5. **U. hirsuta,** *Jack Mal. Misc. ex Hook. Bot. Misc.* ii. 87; leaves oblong with scattered hairs above and stellate hairs beneath, peduncle 1- rarely 2-flowered, bracts large deciduous basal, carpels long-stalked warted hairy. —*Blume Fl. Jav. Anon.* t. 5: *Wall. Cat.* 6458 (*excl. C*); *H. f. & T. Fl. Ind.* 99. U. trichomalla, *Blume l.c.* 42 t. 18; *Roxb. Fl. Ind.* ii. 665.

Penang, *Jack;* Singapore, *Lobb.*—Distrib. Sumatra, Java.

A woody sarmentose shrub; young branches softly hairy. *Leaves* 5–6 by 1½–2½ in., base rounded or cordate; petiole ⅛ in. *Flowers* 1½ in. diam., red; buds globose, hairy; peduncles 1 in., terminal or lateral, softly hairy, articulate near the base; bract ½ in. *Sepals* large, orbicular, connate. *Petals* oblong, downy. *Carpels* 1–1½ in., oblong or ovate-oblong, beak obscurely keeled—"deep orange, rugose, densely stellate-pilose," *Maingay mss.*

γ. *Leaves glabrous, except on the nerves.*

6. **U. bracteata,** *Roxb. Fl. Ind.* ii. 660; leaves oblong or obovate-oblong acute or shortly acuminate, peduncle 1–2-flowered, bract median leafy petioled, carpels subsessile oblong obtuse young tomentose. *Wall. Cat.* 6468; *H. f. & T. Fl. Ind.* 100. U. Gomeziana, *A. DC. Mem. Anon.* 27; *Wall. Cat.* 6459.

Eastern Bengal, from Silhet, *Roxburgh;* to Tenasserim, *Wallich.*

A large woody climber; young branches tomentose. *Leaves* 4–7 by 1¾–2½ in., base rounded, thin, firm, glabrous except the midrib and nerves beneath; petiole ¼–½ in., tomentose. *Flowers* ½ in. diam., pale yellow; peduncles ½ in., leaf-opposed; bract ½ in., oblong or ovate. *Sepals* connate to the middle, pubescent. *Carpels* 1–2 in.

7. **U. Lobbiana,** *H. f. & T. Fl. Ind.* 100; leaves oblong or obovate-oblong obtuse acute or mucronate glabrous, peduncle 2–4-flowered, bract small cordate amplexicaul at the fork, carpels obliquely ovoid long-stalked tubercled.

Malacca, *Griffith, Maingay*, and Sincapore, *Lobb.*

A large woody climber; branchlets pubescent. *Leaves* 4–7 by 1¾–3 in., base rounded or subcordate, thin, coriaceous, midrib and under surface with sometimes a few stellate hairs; petiole ¼–⅓ in. *Flowers* 1 in. diam., purplish-brown; buds globose; peduncles terminal and leaf-opposed, pedicels bracteolate; bracts and bracteoles about ½ in. *Sepals* connate for ⅔ their length into a wavy cup. *Petals* broad-oval, tomentose, warted on both surfaces. *Carpels* 1 in., tomentose.—Near *U. ptychocalyx*, Miq.

** Peduncles 3–6-flowered, leaf-opposed. (See 3, *dulcis* and 7, *Lobbiana.*)

8. **U. macrophylla,** *Roxb. Fl. Ind.* ii. 663; leaves oblong or obovate-oblong abruptly acuminate, glabrous or stellate-pubescent beneath, peduncle many-flowered, bracts small oval basal, carpels ovoid or oblong glabrous sessile or stalked. *Wall. Pl. As. Rar.* t. 122; *Cat.* 6487; *H. f. & T. Fl. Ind.* 97; *Beddome Ic. Pl. Ind. Or.* t. 81. U. cordata, *Wall. Cat.* 6486. Guatteria cordata, *Dunal Anon.* 129 t. 30; *DC. Prodr.* i. 93.

Eastern Bengal, from Silhet to Ava and Sincapore; South-Eastern districts of Ceylon.—Distrib. Java.

A large sarmentose shrub; young parts tomentose. *Leaves* 6–12 by 3–6 in., base cordate, nerves above tomentose; petiole ¼–½ in. *Flowers* 1½ in. diam., reddish-brown; peduncles 1 in., and bracts tomentose; pedicels short; bracteole supramedian. *Petals* broad-oval, pubescent. *Carpels* 1–1½ in., berried, sometimes shorter than their stalk.—The Borneo and Philippine specimens formerly identified with this, we refer to *U. ovalifolia*, Blume.

9. **U. semecarpifolia,** *H. f. & T. Fl. Ind.* 97; leaves oblong or obovate-oblong obtuse or mucronate rarely acute very thick stellate-pubescent beneath, peduncle 3–6-flowered, bracts at the forks scaly, carpels shortly stalked smooth tomentose.—*Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 82.

Malacca, *Griffith;* tropical forests of Central and S. E. Ceylon.

A woody climber; branches tomentose. *Leaves* 6–10 by 2½–4½ in., slightly cordate, nerves above pubescent; petiole ¼ in. *Flowers* 1–1½ in. diam., greenish-brown; peduncles ½ in., leaf-opposed, tomentose. *Petals* broad-oval, hoary. *Carpels* 1 in. diam., subglobose.—Malacca specimens have more distant nerves than Ceylon ones.

10. **U. ptychocalyx,** *Miq. Ann. Mus. Lugd. Bat.* ii. 4; leaves oblong or obovate-oblong obtuse or abruptly acuminate stellately hairy beneath at length glabrous, peduncle 2–3-flowered with a large leafy bract at the base

Mo. Bot. Garden.
1896.

of each pedicel and a bracteole under the calyx, carpels stalked subglobose rough densely tomentose.

Forests of PEGU, *Maclelland*, &c.—DISTRIB. Sumatra, Java?

A woody climber; bark dark grey, rugged; young parts densely tomentose. *Leaves* 4–12 by 2–5 in., slightly cordate, midrib and nerves above tomentose; petiole ⅙–¼ in. *Flowers* 1¼ in. diam., dull red-purple; pedicels ⅓–½ in.; bract ½–1 in. long, ovate, tomentose. *Sepals* connate halfway up into a densely tomentose cup, margins subplicate. *Petals* fleshy, oval or obovate-oblong, obtuse, tubercular, pubescent. *Carpels* size of a cherry; stalk 1–1½ in.

*** Peduncles axillary, 1-flowered.

11. **U. subrepanda,** *Wall. Cat.* 6483; leaves oblong or obovate-oblong acute glabrous above pubescent beneath at length glabrous, peduncles slender stellately pubescent bracteolate about the middle and base. *H. f. & T. Fl. Ind.* 101.

SINGAPORE, *Wallich.*

A shrub; branches very slender, young parts pubescent. *Leaves* membranous, midrib pubescent above. *Peduncles* 1 in.; bracteoles concave.—A very imperfectly known plant.

SECT. II. Stamens all cuneate; connective truncate or capitate or hardly produced beyond the cells.

* *Flowers* 1 *inch or more in diameter.*

12. **U. macropoda,** *H. f. & T. Fl. Ind.* 101; leaves 3–6 in. oblong or lanceolate acute or acuminate glabrous, buds tubercled beaked, carpels oblong granulate 3-quetrous very long stalked. *Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 79.

Forests in Central and Eastern CEYLON, *Walker*, &c.

A large woody climber; branchlets glabrous or with sparse stellate scales. *Leaves* 3–6 by 1–2 in., shining above, pale beneath; petiole ¼ in. *Flowers* 2 in. diam., reddish brown, terminal or leaf-opposed; peduncle scurfy. *Sepals* granular, tomentose inside, orbicular, mucronate. *Petals* oblong. *Carpels* 15–30, 1–2 in., berried, scarlet; stalk 3–6 in., clavate.

13. **U. Narum,** *Wall. Cat.* 6473; leaves 3–8 in. oblong-lanceolate or narrow-oblong acute or shortly acuminate glabrous, buds globose stellate-tomentose, carpels ovoid or oblong smooth slender-stalked. *W. & A. Prodr.* 9; *Wight Ill.* 1, t. 6; *H. f. & T. Fl. Ind.* 102; *Thwaites Enum.* 6. Unona Narum, *Dunal Anon.* 99; *DC. Prodr.* i. 89.

Forests of the WESTERN PENINSULA; central province of CEYLON, ascending to 4000 ft.

A large woody climber; branches glabrous. *Leaves* 3–6 by 1¼–1¾ in., shining above; petiole ¼ in., glabrous. *Flowers* 1–1½ in. diam., terminal or leaf-opposed, solitary, reddish or dingy green; pedicels 1–1½ in., filiform, glabrous. *Sepals* orbicular, subacute. *Petals* sometimes 7–8, oval or oblong, connate below. *Carpels* 1 in., scarlet, subtorulose, glabrous; stalk 1–2 in.

VAR. 1. *Eunarum;* leaves 3–6 in., more oblong-lanceolate.

VAR. 2. *macrophylla;* leaves 6–9 in., lanceolate, carpels on longer thicker angular stalks.—U. lurida, var. β, *H. f. & T. Fl. Ind.* 101; *Wall. Cat.* 6473; *Dalz. & Gibs. Fl. Bombay*, 3.

14. **U. lurida,** *H. f. & T. Fl. Ind.* 101 (*excl. var. β*); leaves oblong or oblong-lanceolate acute or acuminate, glabrous and shining on both surfaces, buds globose rough glandular, fruit unknown.

Northern slopes of the KHASIA HILLS, alt. 2000 ft., *H. f. & T.*

A large woody climber; young parts with stellate scales. *Leaves* 3–8 by 1–2½ in., base rounded or acute, paler beneath; petiole ⅓ in. *Flowers* 2 in. diam., solitary or geminate; peduncles 1 in., stellately pubescent. *Petals* broad-obovate, obtuse.—Possibly a state of *U. Narum.*

15. **U. zeylanica,** *L.;* leaves lanceolate or oblong-lanceolate acute or acuminate thickly coriaceous quite glabrous, buds very small subglobose, carpels subsessile ovoid or globose hoary.—*Dunal Anon.* 88; *DC. Prodr.* i. 88; *H. f. & T. Fl. Ind.* 102; *Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 78. U. coriacea, *Vahl Symb.* iii. 72. U. lutea, *Wall. Cat.* 6462 (*not of Roxb.*). U. Heyneana, *W. & A. Prodr.* 8 (*not of Wall.*). Guatteria Malabarica, *Dunal Anon.* 134. G. montana, *DC. Prodr.* i. 94.

MALABAR, TRAVANCOR, and CEYLON.

A large woody climber; branchlets tomentose. *Leaves* 2½–3½ by ¾–1¼ in., base acute, dark green and shining above, red or pale beneath; petiole very short. *Flowers* 1 in. diam., solitary or geminate, dull red; peduncles ½ in., terminal or leaf-opposed, tomentose; bracts several, scaly. *Petals* oblong, acute. *Carpels* ½ in.

16. **U. pauciovulata,** *H. f. & T.;* leaves elliptic or oblong obtuse or obtusely acuminate glabrous shining above paler and scaberulous beneath pubescent on the strong nerves, racemes terminal few-flowered, carpels globose mammillate tomentose long-stalked.

MALACCA, *Maingay.*

A flexuous shrub; branchlets bracts sepals and petals externally brown-tomentose or scurfy. *Leaves* 2–5 by 1–2½ in., rigid, coriaceous, base rounded or cordate, nerves many spreading; petiole ⅒ in. *Flowers* 1½ in. diam.; peduncle short, stout, 1–3-flowered; bracts orbicular; buds globose. *Sepals* ¼ in., orbicular, connate to the middle. *Outer petals* 1½ in., orbicular-oblong, very coriaceous, glabrous within; inner as long, narrower. *Torus* flattish. *Ovaries* linear, with stellate scales, base solid; style cylindric, stigma obtuse; ovules 1–3 superposed. *Carpels* 12–15, ⅓–½ in. diam., 1–2 seeded; stalk ½–¾ in., slender. *Seeds* horizontal, compressed, testa shining.

** *Flowers small, ½ inch or less in diameter.*

17. **U. micrantha,** *H. f. & T. Fl. Ind.* 103; leaves oblong-lanceolate obtusely acuminate glabrous coriaceous, petiole very short, buds globose pubescent, carpels glabrous granulate. Guatteria micrantha, *A. DC. Mem.* 42; *Wall. Cat.* 6449. Polyalthia fruticans, *A. DC. l.c.* 42; *Wall. Cat.* 6430.

EASTERN PENINSULA; from Ava and Tenasserim, to Penang.

A large woody climber; young parts tomentose. *Leaves* 2–3 by ¾–1⅓ in., base acute, midrib above and under surface when young slightly hairy. *Flowers* ⅓–½ in. diam., white; peduncles 1–3, ⅓ in., tomentose; bracteoles 2–3, orbicular. *Sepals* pubescent outside, persistent, not much imbricated. *Carpels* 15–20, ¼–⅓ in., stalk as long.

18. **U. sumatrana,** *H. f. & T.;* leaves elliptic-oblong or oblong-lanceolate membranous long-acuminate tip obtuse or acute glabrous, petiole very short, flowers minute fascicled. Anaxagorea sumatrana, *Miq. Fl. Ind. Bat. Suppl.* i. 382.

ANDAMAN ISLANDS, *Kurz.*

Branches slender, rough, young brown-tomentose. *Leaves* 3–6 by ¾–1½ in., base rounded or subacute, midrib above tomentose; petiole very short, tomentose. *Flowers* terminal or leaf-opposed, tomentose; bracteole submedian, small, orbicular, tomentose. *Sepals* ovate, acute. *Petals* twice as long, broad-ovate.

19. **U. parviflora,** *H. f. & T. Fl. Ind.* 103; leaves oblong usually acuminate membranous pellucid-dotted, petiole ⅓–½ in., buds minute globose, peduncles 1–4-flowered with several bracts.

PENANG, *Phillips.*
A slender woody climber; branchlets glabrous; buds tomentose. *Leaves* 4–6 by 1½–2½ in., base acute, nerves reticulate. *Flowers* very minute; peduncle about ½ in., leaf-opposed or nearly so; bracts alternate; pedicels ⅓–½ in., puberulous; bracteole submedian, linear-oblong. *Sepals* orbicular, pubescent. *Petals* ovate, acute.

U. SCLEROCARPA, *A. DC. Mem. Anon.* 27; *Wall. Cat.* 6461, from Moulmein, is a very doubtful plant, of which the flower is unknown and fruit immature.

3. **ELLIPEIA,** H. f. & T.

Characters of Uvaria, but differing in the oblong style, solitary ventral or subbasal ovule, and 1-seeded carpels.—DISTRIB. Malayan Peninsula and Archipelago; species 5 or 6—Reduced to *Uvaria* by Baillon.

1. **E. cuneifolia,** *H. f. & T. Fl. Ind.* 104; leaves oblong or bovate-oblong abruptly acuminate glabrous above tomentose beneath,oflowers in terminal panicles, carpels tomentose oblong obtuse. *Hook. Ic. Pl.* t. 1025.

MALACCA, *Griffith, Maingay.*
Branches woody, brown-tomentose. *Leaves* 6–8 by 2–3 in., firm, coriaceous, base rounded or subcordate, shining above except the tomentose midrib; petiole ¼ in. *Pedicels* ½ in., densely tomentose; bracts at each fork oblong or ovate; bracteole under the calyx, orbicular. *Flowers* 1½ in. diam., densely tomentose. *Carpels* ½–3 in., with a lateral mucro; stalk 1 in.

2. **E. ferruginea,** *H. f. & T.*; leaves oblong or obovate acute or obtuse appressed pubescent above densely stellate tomentose beneath, flowers solitary terminal or leaf-opposed, carpels stellate-tomentose. Uvaria ferruginea, *Ham.*; *H. f. & T. Fl. Ind.* 96.

Forests of AVA at Meaday, *Hamilton;* and PEGU, *Kurz.*
Scandent; branches slender, brown-tomentose. *Leaves* 3–6 by 1½–3½ in.; petiole ⅙–⅓ in., brown-tomentose. *Flowers* 1¼–1½ in. diam., grey-pubescent; peduncle ⅓–½ in.; bracts submedian, oblong or lanceolate, deciduous. *Sepals* ⅓ in., broad-ovate, acute. *Petals* ¾ in., oval. *Carpels* many, shortly stalked.—M. Kurz sends detached fruits, from which the description is taken.

3. **E. glabra,** *H. f. & T.*; leaves oblong or elliptic-oblong shortly acuminate quite coriaceous glabrous on both surfaces, cymes axillary 3–5-flowered, carpels subglobose, stalk slender.

MALACCA, *Maingay.*
A tree; branchlets and inflorescence brown-pubescent. *Leaves* 4–5½ by 1½–2 in., base rounded or acute, rigid above, hardly shining, beneath rather paler, veins strong arched; petiole ¼–⅓ in., glabrous. *Flowers* 1½ in. diam., cymes 1–1½ in.; peduncle very short; pedicels longer; bracteole oblong, ½-amplexicaul, recurved. *Sepals* ¼ in., ovate-lanceolate, acute, recurved. *Petals* flat, not clawed, outer 1 in. obovate-lanceolate, subacute; inner shorter, obovate, obtuse. *Ovaries* glabrous below, solid and strigose above: ovule 1, erect (Maingay). *Carpels* ⅔ in., walls thin; stalk ¾–1¼ in., slender. *Seed* oblong, pale, girt with a deep longitudinal furrow.—Very different in habit from its congeners.

4. **E. nervosa,** *H. f. & T.*; branches glabrous, leaves elliptic-oblong or lanceolate finely acuminate coriaceous glabrous pale, nerves beneath strong oblique, flowers solitary extra-axillary polygamous, carpels glabrous stalk stout.

MALACCA, *Maingay.*
Branches stout. *Leaves* 6–10 by 2¼–3 in., base acute, nerves very oblique, faint above;

petiole ½ in., thickened, glabrous. *Flowers* ¾ in. diam, silky-pubescent, solitary, leaf-opposed; peduncle short, stout; bracts basal. *Sepals* broad-ovate, obtuse. *Petals* spreading, imbricate (Maingay), outer obovate-oblong, obtuse; inner rather shorter, oblong. *Stamens* in ♂ very many, in ♀ few. *Ovaries* many, curved, top rounded. *Unripe carpels* ¾ in., narrow-ovoid, curved, narrowed at either end, fleshy.

4. CYATHOCALYX, Champion.

Trees. *Leaves* glabrous. *Flowers* fascicled terminal or leaf-opposed. *Sepals* free or united into a 3-lobed cup. *Petals* 6, 2-seriate, valvate in bud, subequal, bases concave conniving, blade flat spreading. *Stamens* indefinite, long-cuneate, truncate; anther-cells linear, dorsal. *Ovaries* solitary (or 2–3 in *C. ? Maingayi*), on a concave torus; stigma large, peltate; ovules many. *Ripe carpels* berried.—Distrib. Tropical India; species 3.

1. **C. zeylanicus,** *Champ.; H. f. & T. Fl. Ind.* 127; leaves oblong-lanceolate acuminate, calyx truncate remotely 3-toothed, carpel oblong or subglobose. *Thwaites Enum.* 9; *Beddome Ic. Pl. Ind. Or.* t. 47.

Central and southern provinces of Ceylon, *Walker.*

A tree; branches glabrous; bark dark, buds golden-pubescent. *Leaves* 6–10 by 2–3 in., base acute; petiole ½ in. *Flowers* 1–3, fascicled on a short woody peduncle, pale green; pedicels ½–1 in. *Petals* 2½ by 1½ in., brown-pubescent. *Carpels* 2½ in. diam., berried. *Seeds* compressed, 1 in., sides transversely rugose, testa red-brown, bony.—We have removed the Mergui plant of Griffith (No. 1032) to the following.

2. **C. martabanicus,** *H. f. & T.;* leaves ovate or oblong acuminate, calyx acutely 3-lobed to the middle, carpel oval.

Forests of Pegu, Tenasserim and Martaban.

A tree; branches smooth, glabrous, young puberulous. *Leaves* 6–8 by 2–4 in.; petiole ½ in. *Flowers* 1–3 together, leaf-opposed; pedicels very short, pubescent. *Calyx* pubescent. *Petals* ¾–1 in., inner shortest and narrowest. *Carpel* 3 by 1½ in.

3. **C.? Maingayi,** *H. f. & T.;* leaves glabrous broad-elliptic or elliptic-oblong, tip ½ in. abruptly caudate linear obtuse, buds subglobose silky, carpels very large thick subglobose sessile.

Malacca, *Maingay.*

A tree; branchlets nearly glabrous. *Leaves* 5–7 by 2–3 in., base obtuse or sub-acute, membranous, beneath concolorous, nerves slender; petiole 1⁄12–⅙ in. *Flowers* 2 in. diam, several on a short pubescent axillary bracteate peduncle. *Sepals* almost free, ovate, acute, densely pubescent. *Outer petals* obovate, rusty pubescent; inner rather smaller and narrower. *Connective* not prolonged. *Ovaries* 2–3; ovules 10, 2-seriate. *Carpels* 2–3½ by 1½–3 in., subverrucose, pubescent, at length glabrous. *Seeds* many, broad, flattened, imbricate in 2 series; testa bony.—Referred to near *Artabotrys* and *Cananga* by Maingay; a very doubtful member of this genus. Petals valvate below, imbricate above.

5. ARTABOTRYS, R. Brown.

Sarmentose or scandent shrubs. *Leaves* shining. *Flowers* solitary or fascicled, usually on woody usually hooked recurved branches (peduncles). *Sepals* 3, valvate. *Petals* 6, 2-seriate, bases concave connivent, limb spreading, flat subterete or clavate. *Stamens* oblong or cuneate; connective truncate or produced; anther-cells dorsal. *Torus* flat or convex. *Ovaries* few or many; style oblong or columnar; ovules 2, erect, collateral. *Ripe carpels* berried.—Distrib. Tropical Africa and Eastern Asia.

* *Limb of petals broad-lanceolate or elliptic-oblong.*

1. **A. odoratissimus,** *R. Br. in Bot. Reg.* 423, *not of Blume;* leaves oblong or lanceolate glabrous, petals glabrous when expanded, carpels glabrous. *Wall. Cat.* 6415; *W. & A. Prodr.* 10: *H. f. & T. Fl. Ind.* 128. A. hamatus, *Blume Fl. Jav. Anon.* 60, t. 29, 31 C. Unona hamata, *Dunal Anon.* 106, t. 17; *DC. Prodr.* i. 90. Uvaria odoratissima *and* hamata, *Roxb. Fl. Ind.* ii. 666.

Southern parts of the Western Peninsula, and in Ceylon; cultivated throughout India—Distrib. Java, S. China.

A glabrous shrub; branches long. *Leaves* 2–8 by 1–2 in. *Flowers* yellow, solitary or geminate. *Petals* 1–1$\frac{3}{4}$ in., nearly equal, young pubescent, especially at the base. *Carpels* obovate-oblong, yellow, odorous.

2. **A. Kurzii,** *H. f. & T.;* leaves obovate-oblong obtuse or obtusely mucronate or elliptic and acute at both ends, glabrous except the pilose nerves and midrib, flowers on solitary slender (not hooked) peduncles, petals grey-pubescent, carpels glabrous.

Forests of Pegu, *Kurz.*

Shrubby, sarmentose; young parts brown-tomentose. *Leaves* 2$\frac{1}{2}$–6 by 1$\frac{1}{2}$–2$\frac{1}{2}$ in., shining above, pale below; petiole $\frac{1}{8}$ in. *Flowers* extra-axillary; peduncle $\frac{1}{2}$ in., strigose. *Sepals* $\frac{1}{2}$ in., triangular, acuminate. *Petals* about 1$\frac{1}{2}$ in., limb oblong, subacute or obtuse, grey-pubescent; inner rather shorter. *Carpels* (unripe) many.—The peduncles, which are not hooked in flower, may become so in fruit.

3. **A. zeylanicus,** *H. f. & T. Fl. Ind.* 128; leaves oblong or lanceolate acute or obtusely acuminate glabrous, peduncle leaf-opposed, sepals as broad as long, petals tomentose, carpels tomentose. *Beddome Ic. Pl. Ind. Or.* t. 48.

Forests of Malabar, Canara, Central and Southern Ceylon.

A woody climber; branchlets puberulous. *Leaves* 4–6 by 1$\frac{1}{2}$–2$\frac{1}{2}$ in.; petiole $\frac{1}{6}$ in. *Flowers* brown-tomentose; pedicels $\frac{1}{2}$ in., pubescent. *Sepals* puberulous, $\frac{1}{4}$ in. long. *Petals* 1$\frac{1}{4}$–1$\frac{1}{2}$ in., inner shorter and narrower; limb flat, lanceolate. *Carpels* broad obovoid, mucronate.

4. **A. crassifolius,** *H. f. & T.;* leaves elliptic or oblong obtuse subacute or obtusely mucronate, coriaceous glabrous or pilose beneath, petiole very thick, peduncles reflexed woody, petals and carpels densely tomentose.

Eastern Peninsula, from Martaban, *Brandis*, to Malacca, *Griffith.*

A large woody climber; branchlets tomentose. *Leaves* 6 by 2$\frac{1}{2}$–3 in., base acute or obtuse, lucid above, pale and strongly nerved beneath; petiole $\frac{1}{2}$ in., glabrous. *Pedicels* $\frac{1}{2}$ in., brown-tomentose. *Sepals* ovate-lanceolate, and petals densely tomentose; the latter 1$\frac{1}{2}$ by 1$\frac{1}{2}$ in., inner shorter and half the width. *Ovaries* sparingly hairy; style cylindric. *Carpels* many, 1$\frac{1}{4}$ in., obovoid, very thick, glabrous, granulate; stalk hardly any.

5. **A. pleurocarpus,** *Maingay mss.;* leaves elliptic or oblong-lanceolate or oblanceolate caudate-acuminate membranous glabrous, flowers fascicled, peduncles falcate, petals subequal elliptic-oblong obtuse, ovaries glabrous, carpels pubescent broad elliptic.

Malacca, *Maingay.*

A scandent shrub; branches slender, glabrous. *Leaves* 5–8 by 1$\frac{3}{4}$–2 in., base acute, pale, finely reticulate on both surfaces, nerves slender, spreading; petiole $\frac{1}{8}$–$\frac{1}{6}$ in. *Peduncles* $\frac{1}{2}$ in., densely pubescent. *Sepals* $\frac{2}{3}$ in., broad-ovate, obtuse or subacute. *Petals* flat, pubescent on both surfaces; outer 1–1$\frac{1}{3}$ in., inner rather smaller. *Connective* apiculate. *Ovaries* many, slender. *Carpels* $\frac{3}{4}$ in., mammillate, obscurely grooved, narrowed into the short stout stalk. *Seeds* 2, testa stony.

** *Limb of outer or all the petals linear, narrow-oblong or subclavate.*

6. **A. speciosus,** *Kurz. mss. in Hb. Kew.;* leaves oblong obtusely acuminate thick rigid glabrous, peduncles flattened woody reflexed, outer petals linear-lanceolate tapering from the base, inner much narrower, ovaries glabrous.

Andaman Islands, *Kurz.*

Scandent; bark grey, rugged, reticulate; leaf-buds silky. *Leaves* 5–8 by 2–3 in., shining above, dull beneath; petiole ¼ in. *Flowers* fascicled towards the end of the pubescent peduncles. *Sepals* ¼ in., ovate, acute or acuminate, thick, rigid, puberulous outside, glabrous within. *Outer petals* 2 by ¼ in., appressed pubescent, claw concave; inner much contracted above the orbicular concave claw, narrow-linear. *Torus* strigose. *Fruit* unknown.

7. **A. Maingayi,** *H. f. & T.;* leaves elliptic acuminate at both ends glabrous tip caudate, petiole slender, peduncle falcate glabrous, outer petals linear-oblong, inner rather smaller, ovaries glabrous, carpels sessile glabrous.

Malacca, *Maingay.*

Branches black, glabrous, slender. *Leaves* 4–6 by 1½–2 in., thin, concolorous and finely reticulate on both surfaces. *Flowers* 1 in. diam., fascicled; peduncle ½–1½ in., hoary-pubescent. *Sepals* ⅒ in., obtuse. *Outer petals* 1–1¼ by ¼–⅓ in., obtuse, concave; base small, suborbicular; inner smaller and narrower. *Ovaries* 3–4, ovoid *Carpels* 2½ by 1½ in., elliptic-globose, mammillate, yellow, walls thick. *Seeds* 2, plano-convex, testa stony.

8. **A. caudatus,** *Wall. Cat.* 6417; leaves oblong-lanceolate obtusely caudate-acuminate glabrous, peduncles short woody recurved many-flowered, outer petals narrow-linear not contracted above the square claw. *H. f. & T. Fl. Ind.* 129.

Khasia Hills, *Wallich.*

A woody climber; old branches glabrous, young pubescent. *Leaves* 3–5 by 1–2 in., membranous, shining; petiole ⅙ in. *Sepals* short, acute. *Petals* 1⅓ in., flattened, tomentose; inner similar, rather smaller.—Only known from Wallich's specimen in Herb. Linn. Soc.

9. **A. burmanicus,** *Alph. DC. Mem.* 36; leaves oblong obtusely caudate-acuminate softly pubescent beneath, peduncles woody usually 1-flowered tomentose, limb of petals subulate 3-quetrous, carpels glabrate. *Wall. Cat.* 6428; *H. f. & T. Fl. Ind.* 129. Ropalopetalum uniflorum, *Griff. Notul.* iv. 717.

Ava, *Wallich;* Tenasserim, *Griffith.*

A large woody climber; branches slender, young tomentose. *Leaves* 3–7 by 1-2½ in., membranous, glabrous above, except the midrib, nerves subhirsute beneath. *Flowers* about ½ in. long; peduncles obliquely leaf-opposed, old woody and hooked. *Petals* grey-pubescent. *Carpels* ¾ in. obovate-oblong.

10. **A. suaveolens,** *Blume Fl. Jav. Anon.* 62, t. 30, 31 D; leaves oblong-lanceolate acuminate shining above glabrous on both surfaces or sparsely hairy on the midrib beneath, peduncles woody recurved many-flowered, flowers fascicled bracteolate, limb of petals cylindric or subclavate, carpels sessile smooth. *Wall. Cat.* 6416; *H. f. & T. Fl. Ind.* 129; Unona suaveolens, *Blume Bijd.* 17.

From Silhet to Malacca.—Distrib. Eastwards to the Philippines.

A large woody climber; branches dark, striate, young silky. *Leaves* 3–5 by 1–1½ in., base acute, pale beneath; petiole ¼ in. *Flowers* about ½ in. long, yellowish, odorous; bracts subulate, deciduous. *Petals* grey-pubescent. *Carpels* small, oblong.

6. **DREPANANTHUS,** Maingay, mss.

Trees. Leaves large, pubescent beneath. *Racemes* short, fascicled on woody truncal tubercles. *Sepals* 3, nearly free. *Petals* 6, valvate, 2-seriate, subequal; bases concave, connivent; limb erect or spreading, broad or narrow. *Stamens* many, cuneate, truncate; anthers linear, cells lateral; connective not produced. *Ovaries* 4–12; stigma subsessile; ovules 4 or more, 2-seriate. *Carpels* globose, several-seeded.

1. **D. pruniferus,** *Maingay mss.*; leaves oblong abruptly acuminate rusty-pubescent beneath, sepals nearly equalling the petals, limb and base of petals nearly equal, both broad obtuse.

MALACCA, *Maingay*

A tree; branches stout, woody, pubescent. *Leaves* 8–12 by 4–5 in., base obliquely rounded or cordate, very coriaceous, opaque above, veins many, strong; petiole $\frac{1}{2}$ in., very stout. *Flowers* 1 in. diam., rusty tomentose peduncles $\frac{1}{2}$–1 in., stout, scarred, pedicels $\frac{3}{4}$ in., stout; bract oblong, median. *Sepals* $\frac{3}{4}$ in., broad-ovate, acute. *Petals* constricted in the middle. *Ovaries* 8–12, silky; ovules many. *Carpels* 1$\frac{1}{2}$ in. diam., sessile, pruinose. *Seeds* horizontal.

2. **D. ramuliflorus,** *Maingay mss.*; leaves oblong obtuse pubescent beneath, sepals much shorter than the petals, limb of petals slender linear much longer than their broad base.

MALACCA, *Maingay.*

A lofty tree. *Leaves* as in *O. pruniferus*, but tip more obtuse, base less cordate. *Flowers* $\frac{1}{2}$ in. long; peduncles densely crowded, very short; pedicels $\frac{1}{10}$ in., equalling the broad ovate acute sepals, both rusty pubescent. *Petals* with a pale silky base, and incurved grey terete obtuse limb, grooved on the inner face. *Ovaries* 6–10, pilose, 4–6-ovuled. *Carpels* (ripe?) $\frac{2}{3}$ in., sessile, obtuse, densely silky-tomentose; walls thick.

7. **CANANGA,** Rumph.

Tall trees. *Leaves* large. *Flowers* large, yellow, solitary or fascicled on short axillary peduncles. *Sepals* 3, ovate or triangular, valvate. *Petals* 6, 2-seriate, subequal or inner smaller, long, flat, valvate. *Stamens* linear, anther-cells approximate extrorse; connective produced into a lanceolate acute process (truncate in 3? *monosperma*). *Ovaries* many; style oblong (or 0?); stigmas subcapitate; ovules numerous, 2-seriate. *Ripe carpels* many, berried, stalked or sessile. *Seeds* many, testa crustaceous, pitted, sending spinous processes into the albumen.—DISTRIB. All Malayan.—Reduced to *Unona* by Baillon (Hist. Pl. i. 209), but besides the marked characters of flowers and stamens, ovules and seeds, the habit is very different. Baillon also retains the name of *Cananga* for the American plants erroneously referred by Aublet to Rumph's *Cananga*.

1. **C. odorata,** *H. f. & T. Fl. Ind.* 130; leaves ovate-oblong finely acuminate puberulous beneath, petals 3 in. subequal narrow-linear, carpels glabrous long-stalked. Uvaria odorata, *Lam. Ill.* t. 495, f. 1; *Roxb. Fl. Ind.* ii. 661; *Wall. Cat.* 6457; *W. & A. Prodr.* 8; *Blume Fl. Jav. Anon.* t. 9; *Griff. Notul.* iv. 712; U. farcta, *Wall. Cat.* 6460; U. axillaris, *Roxb. Fl. Ind.* ii. 667; Unona odorata *and* U. leptopetala, *Dunal Anon.* 108 and 114; *DC. Prodr.* i. 90 and 91; *Deless. Ic. Sel.* t. 88.

AVA and TENASSERIM, *Wallich.*—DISTRIB. Java, Philippines. Cultivated throughout India and the tropics.

A tall tree; trunk straight; bark smooth, ashy; shoots glabrous. *Leaves* 5–8 by 2–3 in., most puberulous on the veins beneath, base rounded, margins waved; petiole ½ in. *Flowers* 3 in. long, usually 3-nate, drooping, yellow, odorous; peduncles solitary or several from old scars; pedicels 1 in., recurved, hoary, with a few basal and a median scaly bract. *Petals* ⅓ in., base broad, silky when young. *Carpels* about 12, ½–⅔ in., ovoid or obovoid, black, 6–12-seeded.

2. **C. virgata,** *H. f. & T.;* leaves elliptic-oblong obtusely acuminate, petiole and nerves beneath pubescent, inner petals much smaller than the outer, carpels sessile densely tomentose. Unona virgata, *Bl. Bijd.* 14; *Miquel Fl. Ned. Ind.* i. pt. 2, 42. Uvaria virgata, *Bl. Fl. Jav. Anon.* 43, t. 19 and 25 B.

MALACCA, *Maingay.*—DISTRIB. Java.

A large tree; branches rather slender, pale, ultimate puberulous. *Leaves* 4–8 by 2–3½ in., base subacute, thin, pale, membranous, above hardly shining, midrib puberulous and nerves faint, below concolorous, midrib arching, nerves distinct; petiole ¼–⅓ in., pubescent. *Flowers* ⅔–1 in. diam., greenish-brown, 3-nate, axillary, tomentose. *Sepals* ⅙ in., ovate-lanceolate, acute. *Petals* subulate-lanceolate from a broad base; inner flat above, concave below with glabrous red ridges. *Connective* of outer stamens truncate, of inner with a long recurved beak. *Ovaries* 4–6, hirsute; ovules many, 2-seriate; stigma sessile. *Torus* conic, truncate, hairy. *Carpels* 2–3 in., ovoid-oblong, top rounded, walls very thick; base contracted. *Seeds* many, horizontal, 2-seriate.

3.? **C. monosperma,** *Hook f. & T.;* branchlets and leaves quite glabrous, leaves elliptic obtuse acute or obtusely acuminate, nerves many slender nearly horizontal, petals pubescent, outer broad oblong, inner oblong-lanceolate, carpels small glabrous mammillate short-stalked 1-seeded.

MALACCA, *Maingay.*

A tree; branches slender, pale; branchlets and buds glabrous. *Leaves* 3–6 by 1½–2½ in., thin, coriaceous, base subacute, concolorous, petiole ¼ in. *Flowers* axillary, ¾ in. diam., solitary, cernuous; peduncle ¼–⅓ in., glabrous, curved, bract basal. *Sepals* broad-ovate, very small. *Petals* hoary, obtuse, inner as long but much narrower than the outer. *Anthers* truncate. *Torus* convex, hairy. *Ovaries* very many, silky; style 0; ovules several, sub-2-seriate. *Carpels* ⅓ in., very obliquely globose, or broader than long; walls thin, stout. *Seed* a little compressed, shining, pitted.

8. **CYATHOSTEMMA,** Griffith.

A shrub.? *Flowers* subglobose in much-branched axillary pendulous cymes from the old wood. *Sepals* 3, connate, hirsute. *Petals* 6, 2-seriate, short, base fleshy, inner rather smaller, all valvate at the base, tips imbricate. *Torus* flat, margin convex. *Stamens* many, linear; anthers subintrorse, process of connective oblique incurved. *Ovaries* many; style cylindric, glabrous, notched; ovules many, 2-seriate. *Ripe carpels* turgid, many-seeded.

1. **C. viridiflorum,** *Griff. Notul.* iv. 707; *Ic.* iv. t. 650; leaves obovate-oblong or oblong-lanceolate acuminate or apiculate glabrous.

EASTERN PENINSULA, *Griffith;* PENANG, *Maingay;* North ANDAMAN, *Kurz.*

Wood remarkable (Griffith Notul. l.c.), aromatic, pith small, wood cruciately 4-lobed. *Leaves* 4–8 by 2–3 in., base rounded or subacute, petiole ⅙–¼ in. *Flowers* ½ in. diam.; cymes brown-tomentose; bract submedian, oblong. *Sepals* broader than long. *Petals* acute, base contracted, of inner most so, tomentose, granular. *Ovaries* densely tomentose. *Carpels* 1–1½ in., oblong, smooth, glabrous; stalk as long, stout.—Kurz's specimens have leaves only, but these and the wood agree with Griffith's.

9. **UNONA,** Linn.

Trees or shrubs, erect or climbing. *Flowers* often solitary, axillary terminal or leaf-opposed. *Sepals* 3, valvate. *Petals* 6, valvate or open in æstivation, 2-seriate; 3 inner sometimes absent. *Torus* flat or slightly concave. *Stamens* cuneate; anther-cells linear, extrorse, top of connective subglobose or truncate. *Ovaries* numerous; style ovoid or oblong, recurved, grooved; ovules 2–8, 1-seriate (rarely sub-2-seriate). *Ripe carpels* many, usually elongate and constricted between the seeds. *Seeds* few or many.—Distrib. Tropical Asia and Africa; species about 25.

Sect. I. **Desmos,** *H.f. & T.* *Petals* 6.

* *Flowers axillary.*

1. **U. elegans.** *Thwaites Enum.* 398; erect, leaves narrow oblong-lanceolate long-acuminate glabrous, glaucous beneath, petals glabrous (when mature), carpels deeply constricted between the seeds. *Beddome Ic. Pl. Ind. Or.* t. 50.

Forests of Hinidoon Pattoo, Ceylon, *Thwaites.*

A much branched shrub or tree; branches rugose, slender; young golden-silky. *Leaves* 3–5½ by ½–1¼ in.; petiole ¼ in. *Peduncle* ¼–⅓ in., slender; bracts 1–2, minute. *Sepals* ⅓ in., ovate, acute, glabrous. *Outer petals* 1¼–1½ in., oblong-lanceolate, acuminate, pubescent when very young only; inner narrower, shorter.

2. **U. zeylanica,** *H. f. & T. Fl. Ind.* 132; erect, leaves narrowly oblong-lanceolate acute or obtusely taper-pointed coriaceous glabrous, petals glabrous, carpels constricted between the seeds. *Thwaites Enum.* 9; *Beddome Ic. Pl. Ind. Or.* t. 74.

Central province of Ceylon, ascending to 3000 ft., *Walker*, &c.

A small glabrous shrub, 3–6 ft., bark grey, rugged; young buds pubescent. *Leaves* 5–8 by 1¼–2 in., base acute; petiole ½ in. *Flowers* yellow-green, base red inside; peduncles 1–3, ½ in.; bracts minute, deciduous, basal. *Sepals* small, oblong-lanceolate, puberulous. *Petals* 1½ by ⅓ in., coriaceous, lanceolate, inner shorter and narrower. *Carpels* stalked; joints 1–4, ovoid.

3. **U. Dunalii,** *Wall. Cat.* 6425; climbing, leaves oblong-lanceolate acuminate glabrous shining above glaucous beneath, petals glabrous, carpels constricted between the seeds. *H. f. & T. Fl. Ind.* 131 (*excl. the Concan plant*).

Forests of Chittagong at Sitakund, *H. f. & T.*; Penang, *Wallich.*

A large glabrous climber, bark spotted white. *Leaves* 3–4½ by ½–2 in., with scattered hairs on the midrib beneath, base rounded cordate or acute; petiole ⅓ in. *Flowers* pale yellow; peduncle 2-flowered, pubescent; bracts 2–3, basal, scaly. *Sepals* ovate, acute. *Petals* 1⅓ in., lanceolate; inner shorter, narrower. *Ovules* 4–6. *Carpels* of 1–3 ovoid joints.—The Concan specimens referred here in Fl. Ind. are referable to *U. discolor* var. *lævigata,* having leaf-opposed peduncles.

4. **U. pannosa,** *Dalz. in Hook. Kew Journ. Bot.* iii. 207; erect, leaves ovate-lanceolate glabrous above pubescent beneath, petals tomentose, carpels ovoid not constricted between the seeds. *H. f. & T. Fl. Ind.* 135; *Beddome Ic. Pl. Ind. Or.* t. 52; Uvaria mollis, *Wall. Cat.* 6475.

Forests of Concan, *Dalzell;* and Travancor, *Wight,* &c.

A tree; young parts puberulous. *Leaves* 2¼–4 by ¾–1½ in., thin, pellucid-dotted, base rounded or acute. *Flowers* brown-tomentose; peduncles very short; bracts 1 or more, scaly. *Sepals* ovate, acute. *Petals* 1½–2 in., lanceolate, inner narrower and shorter. *Ovules* 2–4. *Carpels* ⅔ in., subsessile, obtuse at both ends, pubescent. *Seeds* 1–3, large, shining.

** *Flowers solitary, extra-axillary, terminal, or leaf-opposed.*

5. **U. dumosa,** *Roxb. Fl. Ind.* ii. 670; climbing, leaves oblong or obovate obtuse or acute glabrous above tomentose beneath, peduncle 1-flowered, sepals cordate, petals large obovate-spathulate, carpels constricted between the seeds. *Wall. Cat.* 6429; *H. f. & T. Fl. Ind.* 131.

Forests of Silhet, *Roxburgh*, &c.; Malacca, *Maingay.*

A woody climber; branchlets brown-tomentose. *Leaves* 3–5 by 1½–2¼ in., brown or yellow beneath, thin, parallel-nerved, base rounded or cordate; petiole ¼ in. *Flowers* large, pendulous, yellow-green; peduncles 1–1½ in., terminal or leaf-opposed, slender, tomentose; bract submedian, small, ovate, tomentose. *Sepals* ½ in. broad, acute, nerved. *Petals* 3 by 1–1½ in., broad-spathulate, nerved, inner rather smaller. *Carpels* (according to Roxburgh) of 2–3 1-seeded joints.

6. **U. Desmos,** *Dunal Anon.* 112; shrubby, leaves oblong acute or acuminate, glabrous above finely pubescent beneath, peduncle 1-flowered slender, sepals ovate acuminate, petals 1 in. broad ovate-lanceolate, carpels constricted between the seeds. *H. f. & T. Fl. Ind.* 134; U. cochinchinensis, *DC. Prodr.* i. 91. U. pedunculosa, *Alph. DC. Mem.* 28; *Wall. Cat.* 6422. U. fulva, *Wall. Cat.* 6427.

From Assam to Singapore, *Wallich.*—Distrib. Cochin-China.

A spreading shrub; branches slender, white-dotted, young golden-silky. *Leaves* 3–8 by 1½–3 in., thickly coriaceous, midrib above slightly hairy, base rounded; petiole ⅓ in., pubescent. *Flowers* large, pale yellow, odorous, pendulous; peduncle 2–8 in., usually ¼–½ in. above the axil; bracts submedian, linear-oblong, deciduous. *Petals* coriaceous, appressed pubescent, nerved, outer 2½ by 1 in., inner shorter and narrower. *Ovules* 4–6. *Carpels* stalked; joints 1–6, glabrous, subglobose.

7. **U. discolor,** *Vahl Symb.* ii. 63, t. 36; shrubby, leaves oblong or oblong-lanceolate acute glabrous above sometimes pubescent beneath, peduncle 1-flowered slender, sepals ovate-lanceolate, petals ½ in. broad lanceolate from a broad base, carpels moniliform. *DC. Prodr.* i. 90; *Wall. Cat.* 6420 (partly); *Roxb. Fl. Ind.* ii. 669; *W. & A. Prodr.* 9; *H. f. & T. Fl. Ind.* 133; *Beddome Ic. Pl. Ind. Or.* t. 51; U. cordifolia, *Roxb. Fl. Ind.* ii. 602? U. Dunalii, *H. f. & T. Fl. Ind.* 131 (the Concan plant); *Dalz. & Gibs. Fl. Bomb.* 3 (*not of Wallich*).

Tropical forests from Sikkim, Assam, and Silhet, to Arracan and Malacca, Orissa, and Concan.—Distrib. Malayan Archipelago (all the forms.)

A spreading or sarmentose shrub; branches slender, leafy; young pubescent, rough with white tubercles. *Leaves* 2–8 by 1–2½ in., shining above, glaucous beneath, base rounded or subcordate; petiole ¼ in. *Flowers* yellow, odorous; peduncles 1–2 in., leaf-opposed or nearly so; bract submedian, oblong or lanceolate, deciduous. *Petals* 2 in. or more, silky pubescent or glabrate. *Ovules* 5–6. *Carpels* stalked, joints 1–6, fleshy.

Var. 1. *pubiflora;* leaves 5–7 in., oblong acute base often cordate, flowers silky.

Var. 2. *lævigata;* leaves 3–4 in., oblong or lanceolate acute base rounded, flowers almost glabrous.—U. chinensis, *DC. Prodr.* i. 90. U. undulata, *Wall. Pl. As. Rar.* iii. t. 265.—Perhaps cultivated only in India, common in the Archipelago and China.

Var. 3. *pubescens;* leaves as in *a*, but densely pubescent beneath.

Var. 4. *latifolia;* leaves 3–5 by 2–2½ in., broad-oval acute, flowers silky

8. **U. Lawii,** *H. f. & T. Fl. Ind.* 132; leaves oblong-lanceolate acute or acuminate thin glabrous above pale and downy beneath, peduncle 1-flowered slender, sepals ovate-lanceolate, petals not ¼ in. broad narrow from a broad base, carpels moniliform. *Beddome Ic. Pl. Ind. Or.* t. 73.

Malabar, *Wight;* Concan, *Law.*

A woody climber?; branches slender, young softly pubescent. *Leaves* 2–4½ by ¾–1½ in., puberulous above when young only, base rounded or slightly cordate; petiole ⅕ in., pubescent. *Flowers* solitary; peduncle 1 in. leaf-opposed or nearly so, bract submedian, oblong, minute. *Sepals* pubescent outside. *Petals* 2–3 in., very long and narrow, base broad orbicular, appressed-pubescent, inner a little longer. *Ovules* 2–3. *Carpels* short-stalked, joints 1–3, ovoid.

9. **U. latifolia,** *H. f. & T.*; arboreous, leaves broad-oval or orbicular obtuse or mucronate glabrous above softly grey-tomentose beneath, peduncle very short, sepals connate at the base ovate acute, petals subequal oblong acute contracted at the base.

Hill forests of the Saluen river, MARTABAN, *Brandis.*

A large tree; branchlets grey-tomentose. *Leaves* 2–4 in., base truncate or subcordate; nerves many, oblique, parallel; petiole ⅓–½ in. *Flowers* appressed-silky, densely fascicled; peduncle with usually a small submedian oblong nerved deciduous bract. *Sepals* ⅓ in., striated. *Petals* 1¼ in. *Ovules* 3–4. *Fruit* unknown.

10. **U. viridiflora,** *Beddome Ic. Pl. Ind. Or.* 34, t. 158; climbing, leaves ovate-lanceolate acuminate appressed pubescent beneath, peduncle slender with a cordate bract, sepals ovate free, petals narrow lanceolate.

Anamallay forests in TRAVANCOR, *Beddome.*

A gigantic climber; branchlets golden-pubescent. *Leaves* 3–5 by 1½ in., membranous, base rounded or cordate, above at length glabrous, whitish beneath; petiole ¼–⅓ in. *Peduncle* axillary or supra-axillary, 1–2 in.; bract pubescent, median, deciduous. *Flowers* 2½–3 in. long, bright green. *Sepals* ¾ in., membranous, nerved. *Outer petals* 2½–3 by ½–⅔ in., inner rather shorter and narrower, all membranous, nerved, reticulate, silky.—Described from Beddome l.c.

*** *Flowers solitary at the base of a leafy shoot.*

11. **U. præcox,** *H. f. & T. Fl. Ind.* 136; arboreous, leaves broad lanceolate acuminate, flowers pendulous from a slender naked peduncle, sepals linear-oblong acute, petals linear glabrous.

Miku hills in UPPER ASSAM, *Simons.*

A tree; branches slender. *Leaves* (very young and thin) 2–3 in., probably much larger when mature. *Flowers* from the axils of fallen leaves; peduncle 1 in. *Sepals* ⅔ in. long. *Petals* 2½–3 by ¼ in. *Ovary* glabrous; ovules 2–3.—A remarkable species of which we have seen but one specimen.

**** *Flowers fascicled on woody abbreviated truncal shoots or tubercles.*

12. **U. stenopetala,** *H. f. & T. Fl. Ind.* 136; leaves oblong-lanceolate broadest above the middle acute or acuminate glabrous above pale beneath, sepals subconnate below narrow-linear, petals subequal very narrow linear.

MOULMEIN and SINCAPORE, *Lobb.*

A tree; young branches rather pubescent. *Leaves* 4–6 by 1¼–1¾, base oblique, pubescent along the midrib beneath; petiole 1/12 in. *Peduncles* ¼–⅓ in., with 1–2 small basal scaly bracts. *Sepals* pubescent. *Petals* 2-3 by ½ in., puberulous. *Ovaries* 4–7, villous; ovules about 5.—The Javan habitat cited in Flora Indica is erroneous, the species having been collected at Sincapore.

13. **U. cauliflora,** *H. f. & T. Fl. Ind.* 137; leaves lanceolate or linear-oblong acute or long acuminate glabrous and shining above brown-pubescent beneath, sepals ovate-lanceolate tomentose, petals narrow linear.

SINCAPORE, *Lobb.*

A tree?; branchlets tomentose. *Leaves* 5–6 by 1¼–1¾, base rounded; petiole 1/12 in. and midrib tomentose. *Peduncles* ¼ in., tomentose. *Sepals* ½ in. *Petals* 2½ by ¼–¾ in., dull red, inner rather narrower. Ovules 3 or 4.

14. **U. pycnantha,** *H. f. & T.*; branchlets softly pubescent, leaves elliptic-oblong or oblong-lanceolate obtusely acuminate glabrous above, midrib puberulous beneath, sepals ovate, petals ½ in. subequal linear obtuse, bases of inner concave.

MALACCA, *Maingay*.

Branchlets rather stout, pubescence pale yellow-brown. *Leaves* 6–9 by 2½–3½ in., firm, coriaceous, pale brown on both surfaces, base obtuse or rounded, beneath pale with prominent lax arching veins; petiole ⅙ in., pubescent. *Flowers* ½–¾ in. diam., tubercles 1–1½ in. diam.; peduncles ¼ in., and sepals brown pubescent; bracts 0. *Sepals* ⅙ in., acute. *Petals* ½–⅔ in., hoary silky outside, glabrate inside, base not dilated, flat; inner rather narrower, base concave. *Torus* columnar, flat-topped, glabrous. *Ovules* 2, superposed.

15. **U. crinita,** *H. f. & T.*; branches densely tomentose, leaves oblong elliptic-oblong or oblanceolate-oblong acuminate glabrous, midrib and nerves pubescent beneath, sepals ovate-lanceolate, petals 6 in. subequal narrow strap-shaped, carpels globose velvety.

MALACCA, *Maingay*.

Branches slender; pubescence long, soft, spreading, rufous. *Leaves* 4–9 by 1¼–2½ in., membranous, pale, base 2-lobed, nerves very indistinct, puberulous chiefly on the prominent nerves beneath; petiole 1/12 in., tomentose. *Flowers* in dense masses, crinite from the numerous pendulous petals; peduncles ⅙–¼ in. and sepals rusty tomentose; tubercle 1–2 in. diam.; bract 0, or linear and infra-median. *Sepals* ⅔ in., spreading, subulate from a broad ovate base. *Petals* ⅓ in. broad at the dilated base, flat and again dilated and as broad about the middle, finely pubescent, 1-nerved, acuminate; inner a little shorter and narrower. *Torus* columnar, truncate. *Ovaries* strigose; ovules 3–5, 1-seriate; stigma punctiform. *Carpels* ⅔ in. diam., rufous; stalk very short.

16. **U. desmantha,** *H. f. & T.*; branchlets softly pubescent, leaves elliptic-oblong or -lanceolate or oblanceolate acutely or obtusely acuminate puberulous beneath, sepals ovate, petals 1–1½ in. subequal linear obtuse, carpels globose.

MALACCA, *Maingay*.

A small tree; pubescence soft, pale yellow-brown. *Leaves* 3–7 by 1¼–2 in., base subacute, coriaceous, opaque above, nerves obscure, beneath paler, nerves distinct oblique; petiole ⅙ in., tomentose. *Flowers* 2½ in. diam., pale red, densely crowded; tubercles 1–2 in. diam.; peduncles ¾ in., puberulous, bract 0. *Sepals* ⅒ in., acute. *Petals* sparsely hoary, tapering to the tip, base not dilated; inner rather narrower. *Stamens*, *torus* and *ovaries* nearly as in *U. pycnantha*, but ovules 3–5, superposed. *Carpels* ½ in. diam, dark, glabrous; stalk 1–1½ in.

SECT. II. **Dasymaschalon.** *Petals* 3; inner series wanting.

17. **U. longiflora,** *Roxb. Fl. Ind.* ii. 668; shrubby, leaves lanceolate or linear-oblong acute or acuminate glabrous glaucous beneath, petiole slender, peduncles axillary 1-flowered, sepals small, petals 6 in. long cohering by their margins, *Wall. Cat.* 6419; *H. f. & T. Fl. Ind.* 134.

Forests of ASSAM, the KHASIA HILLS below 3000 ft., and CHITTAGONG.

A slender sparingly branched glabrous shrub or tree; buds golden-silky. *Leaves* 6–15 by 2–4 in., pellucid-dotted, base rounded or acute; petiole ¼–¾ in. *Flowers* elongated, silky when young, soon glabrous; peduncles 1–10 in.; bracts subbasal, linear, minute, pubescent. *Sepals* rounded, mucronate. *Petals* 3, narrow-linear, ½ in. broad at base, taper-pointed. *Ovules* 2–4. *Carpels* stalked, moniliform; joints 1–4, ovoid or oblong.

18. **U. Dasymaschala,** *Blume Fl. Jav. Anon.* 55, t. 27; shrubby, leaves oblong acute or acuminate rarely obtuse glabrous above glaucous beneath, petiole very short, peduncle axillary 1-flowered, sepals small silky, petals 2–3 by ½ in. linear from a broad base.—*Alph. DC. Mem. Anon.* 28; *Wall. Cat.* 6421; *H. f. & T. Fl. Ind.* 135.

From AVA to SINGAPORE, *Wallich*, &c.—DISTRIB. Sumatra, Java.

An erect or sarmentose shrub; bark dark; branches glabrous or pubescent. *Leaves*

5–9 by 2–4 in., usually broadest above the middle, red-brown beneath; petiole $\frac{1}{12}$ in. *Flowers* pendulous; peduncles 1–2 in., slender, top subclavate; bracts 1 or more, minute, basal. *Petals* appressed-pubescent, young silky, keeled internally. *Ovules* 6–7. *Carpels* moniliform, joints oblong.

VAR. 1. *Blumei;* branches glabrous, leaves pale below glabrous or nearly so.—U. Alphonsii, *Wall. Cat.* 6426.

VAR. 2. *Wallichii;* branches brown-tomentose, leaves glaucous and purple-tinged below.—*Wall. Cat.* 6241.

10. **POLYALTHIA,** Blume.

Trees or shrubs; habit of *Unona. Sepals* 3, valvate or subimbricate. *Petals* 6, 2-seriate, ovate or elongated, flat or the inner vaulted. *Torus* convex. *Stamens* cuneate; anther-cells extrorse, remote. *Ovaries* indefinite; style usually oblong; ovules 1–2, basal and erect, or subbasal and ascending. *Ripe carpels* 1-seeded, berried.—DISTRIB. Tropical Asia and (1 sp.) Australia; species about 30.—Reduced to Unona by Baillon (Hist. des Plantes, 212) probably with good reason.

SECT. I. **Monoon,** *Miquel. Flowers* hermaphrodite. *Petals* flat. *Ovule* solitary, basal, erect.

a Flowers axillary or in the old leaf-axils or on woody tubercles.

* *Petals linear.*

1. **P. longifolia,** *Benth. & H. f. Gen. Pl.* i. 25; branches glabrous, leaves narrow lanceolate glabrous taper-pointed undulate, flowers subumbelled, petals ¾–1 in. long. Guatteria longifolia, *Wall. Cat.* 6442; *W. & A. Prodr.* 10; *Wight Ic.* t. 1; *H. f. & T. Fl. Ind.* 139; *Thwaites Enum.* 10. Uvaria longifolia, *Lam.; Roxb. Fl. Ind.* ii. 664.

TANJORE, *Wight;* drier parts of CEYLON.—Cultivated throughout the hotter parts of India.

A lofty tree; branches slender. *Leaves* 5–8 by 1–2 in., membranous, base acute rarely rounded, shining above, pellucid-dotted; petiole ¼–⅓ in. *Flowers* numerous, dense, yellow-green; peduncles ½ in. or less, hoary; pedicels 1–2 in., densely racemose, slender; bracts minute, linear, basal. *Petals* narrow-linear. *Carpels* ¾ in., ovoid, obtuse at both ends; stalk ½ in., stout, glabrous.

2. **P. bifaria,** *Benth. & H. f. l.c.;* young branches softly pubescent, leaves lanceolate acuminate glabrous above downy beneath, flowers solitary. Guatteria bifaria, *A. DC. Mem.* 41; *Wall. Cat.* 6447; *H. f. & T. Fl. Ind.* 139.

PEGU, *Wallich.*

A tree. *Leaves* 5 by 1½ in., base acute, pellucid-dotted; petiole ⅛ in. *Petals* linear-lanceolate. *Carpels* ovoid, long-stalked.—Wallich's solitary specimen is in Herb. Linn. Soc. and is flowerless. A. De Candolle describes it as differing from *P. cerasoides* only in the linear petals. We suspect it to be a mixture of the flower of *P. simiarum* with the foliage of *P. cerasoides.*

3. **P. coffeoides,** *Benth. & H. f. l.c.;* branches glabrous, leaves lanceolate or oblong-lanceolate taper-pointed undulate glabrous, flowers solitary, petals 1–1½ in. *Beddome Ic. Pl. Ind. Or.* t. 53. Guatteria coffeoides, *Thwaites Enum.* 10; *H. f. & T. Fl. Ind.* 141.

Forests of the WYNAAD, *Beddome;* and CEYLON, *Thwaites.*

A tree; branches spreading. *Leaves* 4–7 by 1–2½ in., membranous, pellucid-dotted; petiole ¼ in. *Flowers* greenish-yellow, rarely on woody tubercles of the trunk; peduncles ½–1½ in., downy, articulate at the base. *Sepals* suborbicular. *Petals* broadly linear-lanceolate, glabrous. *Carpels* nearly 1 in., ovoid, glabrous, dark purple; stalk their own length.

4. **P. fragrans,** *Benth. & H. f. l.c.;* young branches hoary, leaves ovate-oblong or oblong-lanceolate glabrous or puberulous beneath, peduncles few- or many-flowered, petals 1$\frac{1}{2}$ by $\frac{1}{6}$in. *Beddome Ic. Pl. Ind. Or.* t. 54. Guatteria fragrans, *Dalz. in Hook. Kew Journ. Bot.* iii. 206; *H. f. & T. Fl. Ind.* 142.

Forests of MALABAR, *Wight;* SOUTH CONCAN, *Law*, &c.

A tree. *Leaves* 4–9 by 2–5 in., membranous, lateral nerves many oblique close-set and parallel; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Flowers* fragrant; peduncles in the axils of fallen leaves or on woody ramal tubercles, cymose, usually many-flowered, tomentose; pedicels 1 in., slender; bract orbicular, infra-median. *Sepals* small, orbicular. *Petals* linear, hoary. *Carpels* 1$\frac{1}{2}$ in., broad-ovoid, hoary, walls thin brittle; stalk as long.—There are in Hb. Wight. detached petals apparently of this species upwards of 2 in. long.

5. **P. simiarum,** *Benth. & H. f. l.c.;* branches glabrous, leaves ovate-oblong or oblong-lanceolate quite glabrous, flowers fascicled, inner petals 1–1$\frac{1}{4}$ in. Guatteria simiarum, *Ham.; Wall. Cat.* 6440; *H. f. & T. Fl. Ind.* 142. G. fasciculata, *Wall. mss. Voigt Hort. Sub. Calc.* 16.

Forests of ASSAM, SILHET, PEGU and MARTABAN, *Hamilton, Wallich*, &c.

A tree; buds puberulous. *Leaves* 4–8 by 2–5 in., membranous; lateral nerves close, parallel; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* in the old axils or on woody tubercles; peduncles 1 in., slender, hoary, naked above; bracts 1–2, scaly, basal. *Sepals* very short, orbicular. *Petals* linear, puberulous, glabrous within, outer $\frac{1}{3}$ shorter than the inner. *Carpels* 1$\frac{1}{2}$ in., ovoid, fleshy, glabrous, orange; stalk as long.

6. **P. hypoleuca,** *H. f. & T.;* quite glabrous, leaves elliptic or elliptic-lanceolate obtusely acuminate, shining above white beneath, flowers solitary or fascicled, sepals obsolete, petals subequal $\frac{1}{3}$ in. narrowly linear-oblong obtuse.

SINGAPORE, *Maingay.*—DISTRIB. Borneo?

Branches pale, youngest puberulous. *Leaves* 2$\frac{1}{2}$–6 by 1–1$\frac{3}{4}$ in., base acute, thick, rigid, pale and nerveless above, midrib beneath puberulous, nerves many obscure sub-horizontal; petiole $\frac{1}{12}$–$\frac{1}{6}$ in. *Flowers* small, axillary, suberect; peduncle $\frac{1}{10}$ in., stout; bracts 2, basal, cucullate. *Sepals* forming an inconspicuous disk. *Petals* hoary on both surfaces, base concave, not dilated. *Torus* conical. *Ovaries* about 6, pubescent. *Carpels* $\frac{2}{3}$ in., elliptic-oblong, top rounded, glabrous, shining, walls thin; stalk short, slender. *Seed* grooved and pitted.—Other (imperfect?) carpels are mammillate with longer thicker stalks and contain a stony pitted nucleus, connected with the walls by stout fibres.—Very near *U. hypoglauca*, Miq., of Sumatra, but carpels elliptic oblong and twice as long.

** *Petals ovate or ovate-lanceolate or elliptic.*

7. **P. acuminata,** *Thwaites Enum.* 399; young branches brown-tomentose, leaves elliptic- or obovate-oblong abruptly taper-pointed glabrous above, midrib and veins pubescent beneath, flowers 1–3 on woody tubercles, petals 2 by 1 in., thick. *Beddome Ic. Pl. Ind. Or.* t. 57.

Near Ratnapoora in CEYLON, *Thwaites.*

A tree; bark silver-grey. *Leaves* 6–12 by 2$\frac{1}{2}$–3 in., shining above, pale beneath; nerves strong, parallel; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* 3–4 in. diam., greenish-yellow; pedicels 1 in., stout; bract submedian, densely tomentose. *Petals* 2 by 1 in., broad-lanceolate, thickly coriaceous, pubescent, strongly nerved when dry. *Carpels* often as large as a cherry; broad-ovoid, tomentose; stalk as long.

8. **P. cerascides,** *Benth. & H. f. l.c.;* young branches tomentose, leaves lanceolate or oblong-lanceolate acuminate glabrous above softly pu-

bescent beneath, peduncles on axillary tubercles 1–3-flowered, petals $\frac{1}{2}$ in. Uvaria cerasoides, *Roxb. Corom. Pl.* i. t. 33; *Fl. Ind.* ii. 666. Guatteria cerasoides, *Dun. Mem. Anon.* 127; *DC. Prodr.* i. 93; *Wall. Cat.* 6436; *H. f. & T. Fl. Ind.* 139; *Dalz. & Gibs. Bomb. Fl.* 3.

Dry forests on Eastern exposures, from Behar to Travancor, *Hamilton, Wight,* &c.

A tree; bark light-grey; branches glabrous with age. *Leaves* 3–8 by 1–2 in., membranous, base acute or rounded, dark green above. *Peduncles* $\frac{1}{12}$ in., woody; pedicels $\frac{1}{2}$–1 in., slender, with a few basal imbricating scales, and sometimes 2–3 oblong or ovate bracts $\frac{1}{4}$–$\frac{1}{2}$ in. long. *Petals* ovate-oblong, dirty green, thickly coriaceous. *Carpels* size of a small cherry, dark-red; stalk 1 in.

9. **P. Korinti,** *Benth. & H. f. l.c.;* young branches glabrous or subpilose, leaves variable ovate to elliptic-oblong acute or acuminate coriaceous glabrous, flowers axillary solitary, inner petals $\frac{1}{2}$ in. oval. Guatteria Korinti, *Dunal; DC. Prodr.* i. 94; *W. & A. Prodr.* 10; *Wight Ic.* t. 398; *H. f. & T. Fl. Ind.* 141. G. acutiflora, *Wall. Cat.* 6438 *excl. D.*

Western Peninsula, from Vizagapatam, *Cleghorn,* southwards; warmer parts of Ceylon, very common.

A spreading shrub; bark grey. *Leaves* 2–4 by 1–2 in., firmly coriaceous, pellucid-dotted, shining above, glabrous or sparsely pilose on the midrib beneath, strongly reticulate; petiole $\frac{1}{6}$ in. *Peduncles* 1–2 in., strigose, bract submedian. *Petals* thickly coriaceous, inner rather the longest. *Carpels* $\frac{1}{3}$ in., subglobose.

10. **P. Jenkinsii,** *Benth. & H. f. l.c.;* young shoots brown-tomentose, leaves oblong-lanceolate glabrous, flowers axillary solitary rarely geminate, outer petals $1\frac{2}{3}$ by $\frac{1}{2}$ in. Guatteria Jenkinsii, *H. f. & T. Fl. Ind.* 141.

Forests of Assam; Silhet; Eastern Peninsula; Andamans, *Kurz.*—Distrib. Sumatra.

A tree; branches spreading, glabrous. *Leaves* 4–7 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., firm, shining above, pale beneath, base rounded acute or oblique; petiole $\frac{1}{3}$ in. *Flowers* large, spreading; pedicels $\frac{1}{2}$–1 in., erect, bracts 2–3, scaly, basal, and a mesian and an apical one which are oval and deciduous. *Petals* broad-lanceolate, narrowed to a claw, thinly coriaceous, inner shorter and narrower. *Carpels* $\frac{2}{3}$ in., oblong, glabrous; stalk as long.—Nearly allied to *Monoon canangioides,* Miq.

11. **P. nitida,** *Benth. & H. f. l.c.;* young branches puberulous, leaves oblong or lanceolate glabrous obtuse or acute, bracts $\frac{1}{2}$-amplexicaul, sepals connate to the middle, petals 1 in. long, Guatteria nitida, *A. DC. Mem.* 41; *Wall. Cat.* 6439; *H. f. & T. Fl. Ind.* 143.

Tavoy, *Wallich;* Sincapore, *Lobb.*

A tree; bark grey, rugged, dotted with white lenticels. *Leaves* 8–12 by 3–5 in., thinly coriaceous, shining above, pale beneath, nerves strong oblique; petiole $\frac{1}{4}$-$\frac{1}{2}$ in. *Flowers* axillary; pedicel 1 in., bracts 1–2, oval, submedian. *Sepals* $\frac{1}{2}$ in., orbicular, pubescent. *Petals* oval, thickly coriaceous, tomentose, inner a little shorter. *Carpels* large, subglobose, stalked.—*Flower* described from the Sincapore specimen, the fruit from Tavoyan.

12. **P. magnoliæflora,** *Maingay mss.;* branchlets rusty-tomentose, leaves large narrow obovate-oblong obtuse or acuminate glabrous except the midrib above membranous, base cordate, bracts $\frac{1}{2}$-amplexicaul, sepals connate to the middle, outer petals elliptic.

Malacca, *Maingay.*

A tree; branches stout. *Leaves* 10–13 by 3–5 in., opaque above, beneath paler, nerves strong many arched; petiole $\frac{1}{6}$ in., stout. *Flowers* large, greenish-white; peduncle short stout curved; bracts broad-ovate acute. *Sepals* silky tomentose. *Outer petals* fleshy, concave, hairy, tips imbricate; inner 2–$2\frac{1}{2}$ in., oblong, constricted in the middle. *Torus* glabrous. *Ovaries* hirsute. *Carpels* (unripe) 1½ in., ovoid or oblong, gibbous, pubescent, beaked; stalk stout.—A magnificent species, referred to a new genus in Maingay's mss. Colour, odour, &c. of flower like a *Magnolia*.

β Flowers extra-axillary on the terminal branchlets, or on small truncal tubercles.

13. **P. biglandulosa,** *Benth. & H. f. l.c.*; young branches silky, leaves elliptic or oblong acute or acuminate glabrous above appressed pubescent beneath, basal margins recurved and glandular, peduncle solitary leaf-opposed.—Guatteria biglandulosa, *Blume Fl. Jav. Anon.* t. 51; *H. f. & T. Fl. Ind.* 143.

MALACCA, *Griffith*, &c.—DISTRIB. Sumatra and Malay Archipelago.

A scandent shrub. *Leaves* 4–6 by 1½–3 in., shining above, glaucous beneath, base subacute; nerves 7 on each side, strong, curved, rather distant, parallel; petiole ½ in. *Flowers* unknown. *Carpels* 1 in., oblong, mucronate, dark purple, subglabrous; stalk a little longer.—Griffith's specimens correspond to Blume's description and to Miquel's var. *α*. Carpels 1-seeded according to Miquel.

14. **P. suberosa,** *Benth. & H. f. l.c.*; young branches pubescent, leaves oblong obtuse glabrous above puberulous beneath, peduncles 1–2 on a short woody extra-axillary tubercle, petals ⅓ in. long.—*Beddome Ic. Pl. Ind. Or.* t. 56. Uvaria suberosa, *Roxb. Cor. Pl.* i. t. 34; *Fl. Ind.* ii. 567. Guatteria suberosa, *DC. Prodr.* i. 93; *Wall. Cat.* 6437; *W. & A. Prodr.* 10; *H. f. & T. Fl. Ind.* 140.

Forests of BENGAL, the WESTERN PENINSULA, TENASSERIM, and CEYLON.—DISTRIB. Java? Philippines (this or a closely allied species).

A small tree or shrub; bark corky, rugged, grey; young branches slender, often spotted white. *Leaves* 2½–5 by 1–1¾ in., usually obtuse at both ends, or base sub-oblique, thin, glabrous beneath in age; petiole $\frac{1}{12}$ in. *Peduncles* ½–1 in., solitary, rarely geminate, pubescent, bracts inframedian. *Sepals* small, pubescent. *Petals* ½ in., oval, silky outside, red-brown, outer shorter. *Carpels* pisiform, young silky, ripe glabrous; stalk their own length.

15. **P. sclerophylla,** *H. f. & T.*; glabrous, leaves oblong or ovate or linear-oblong obtusely acuminate rigid reticulate and shining on both surfaces, peduncles fascicled on small truncal tubercles, sepals ovate, petals linear-oblong obtuse inner rather smaller.

MALACCA, *Maingay*.

A tree. *Leaves* 6–8 by 1½–2½ in., base rounded or acute, nerves conspicuous and midrib quite glabrous on both surfaces; petiole ¼ in. *Flowers* 2 in. diam., greenish; tubercles ½–1 in. diam., globose; peduncles 1–1½ in., stout, rusty-pubescent; bracts small median, orbicular. *Sepals* short, obtuse. *Petals* 1½ in., base slightly concave, puberulous on both surfaces. *Torus* broad, flat, border raised. *Ovaries* pilose, shorter than the cylindric style. *Carpels* 1–1½ in., elliptic-oblong, obtuse at both ends walls thin, smooth; stalk as long, slender. *Seed* oblong, testa fibrous shining pale.

SECT. II. **Eupolyalthia.** *Flowers* hermaphrodite. *Petals* flat. *Ovules* 2, superposed, subbasal, ascending.

* *Flowers extra-axillary, often leaf-opposed.*

16. **P. cinnamomea,** *H. f. & T. Fl. Ind.* 138; young branches brown-tomentose, leaves lanceolate or oblanceolate glabrous above, young pubescent beneath, peduncles solitary or geminate, petals ¾ in. oblong acute. Guatteria cinnamomea *and* G. multinervis, *Wall. Cat.* 6444 and 6445.

PENANG and SINCAPORE, *Wallich.*

A tree; bark grey, rugged. *Leaves* 6–10 by 2–$3\frac{1}{2}$ in., tapering downwards from the middle or above it, base obtuse or subcordate; petiole $\frac{1}{6}$ in. *Peduncles* $\frac{1}{4}$–$\frac{1}{2}$ in., extra-axillary, brown-tomentose; bracts scaly, basal. *Sepals* small, ovate, acute. *Petals* thick, silky outside. *Carpels* 1 in. diam., globose, short-stalked, densely brown-tomentose.

17. **P. Moonii,** *Thwaites Enum.* 9; young branches pubescent, leaves subsessile lanceolate long acuminate glabrous above puberulous beneath, peduncles solitary slender glabrous, petals small inner suborbicular. *Beddome Ic. Pl. Ind. Or.* t. 83.

At Caltura and Regiam Corle in CEYLON, *Thwaites.*

A shrub, 8–10 ft.; branches slender. *Leaves* 2–6 by $\frac{3}{4}$–2 in., tapering to the obliquely rounded base, thin, midrib pubescent beneath; petiole not $\frac{1}{12}$ in. *Flowers* red, $\frac{1}{3}$ in. diam.,; pedicels 1–$1\frac{1}{2}$ in., often leaf-opposed, nearly glabrous; bracts 3, minute, glabrous. *Sepals* small, ovate, acuminate. *Outer petals* acute; inner larger, suborbicular, obtuse. *Carpels* pisiform or oblong, reddish, short stalked, 1–2-seeded.

18. **P. rufescens,** *H. f. & T.*; young branches densely tomentose, leaves subsessile narrow-oblong acute or acuminate, base obliquely cordate glabrous except on the midrib beneath, peduncles solitary stout tomentose, petals $\frac{1}{4}$ in. ovate-oblong.

Cochin in MALABAR, *Wight.*

A tree. *Leaves* 3–7 by 1–$1\frac{3}{4}$ in., shining above, pale below; petiole glabrous. *Flowers* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., brown-tomentose; peduncles $\frac{1}{2}$–1 in., often leaf-opposed, jointed and minutely bracteate at the base. *Sepals* small, broadly ovate, acute. *Petals* oblong, subacute, thick, outer twice? as big as the inner. *Ovaries* densely silky.

19. **P. persicæfolia,** *Benth. & H. f. l.c.*; young branches pubescent, leaves subsessile lanceolate taper-pointed glabrous above puberulous beneath, peduncles solitary or fascicled pubescent, petals $\frac{1}{6}$–$\frac{1}{4}$ in. long. *Beddome Ic. Pl. Ind. Or.* t. 55. Guatteria persicæfolia, *H. f. & T. Fl. Ind.* 140.

CEYLON, near Galle, *Champion.*

A shrub. *Leaves* 2–4 by $\frac{2}{3}$–$1\frac{1}{4}$ in., firm, coriaceous, base slightly oblique, pale beneath; nerves inconspicuous; petiole hardly $\frac{1}{12}$ in. *Peduncle* very short, woody, extra-axillary, 2–3 flowered; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in. *Sepals* ovate, acute, substrigose. *Petals* suborbicular, thickly coriaceous, appressed-pubescent, inner much the largest. *Carpels* about 10, pisiform, granulate, puberulous; stalk very short; torus small.

20. **P. macrophylla,** *H. f. & T.*; young branches tomentose, leaves lanceolate taper-pointed rigid glabrous and shining above softly pubescent beneath, flowers solitary subsessile. Guatteria macrophylla, *Blume Bijd.* 19; *Fl. Jav. Anon* 96. G. brevipetala, *Miq. Fl. Ned. Ind. Suppl.* i. 381.

MOULMEIN, *Falconer*; ANDAMANS, *Kurz.*—DISTRIB. Sumatra, Java, Borneo.

A tree. *Leaves* 6–9 by 2–3 in., thickly coriaceous, almost silvery beneath with substellate pubescence; nerves distant, prominent, arched, looping within the margin; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., tomentose. *Peduncles* $\frac{1}{12}$ in., generally $\frac{1}{2}$ in. above the leaf axil; bracts strigose. *Sepals* ovate, acute, strigose. *Petals* $\frac{1}{6}$ in., oblong, acute, strigose, glabrous inside; inner rather larger, very concave. *Torus* conical. *Fruit* unknown.—The two flowers we have examined are male. Miquel describes his as bisexual; Blume does not say which; so this character is possibly not constant.

** Flowers axillary or in the axils of old leaves.

21. **P. cauliflora,** *H. f. & T. Fl. Ind.* 138; branches glabrous, leaves lanceolate obtusely acuminate glabrous above, nerves and midrib beneath downy, flowers 2–3 fascicled in the old axils, peduncles slender downy, petals 1 in., linear. Uvaria cauliflora, *Wall. Cat.* 6476.

Sincapore, *Wallich.*

A much branched tree; buds tomentose. *Leaves* 3–6 by 1–1¾ in., narrowed to the subobtuse base, nerves reticulate; petiole ⅛–⅙ in. *Peduncles* 1½–2 in., filiform, downy; bracts basal. *Sepals* ovate, subacute, appressed-pubescent. *Petals* of equal length; coarsely villous, outer rather broader. *Torus* cylindric, truncate. *Ovaries* strigose. *Fruit* unknown.

22. **P. obliqua,** *H. f. & T. Fl. Ind.* 138; young parts puberulous, leaves subsessile linear-oblong obtusely acuminate base obliquely cordate shining and glabrous on both surfaces, peduncles solitary, petals ¼ in. oblong obtuse.

Malacca, *Griffith.*

A tree; branches twiggy, slender, glabrous. *Leaves* 4–6 by 1–1¾ in., tapering to the base, firm, coriaceous, paler beneath; petiole ⅙ in. *Flowers* ½ in. diam., axillary; peduncles ¼–1 in.; bract submedian. *Sepals* small, orbicular. *Petals* subequal, thickly coriaceous, silky outside. *Carpels* pisiform, dark brown; stalk ½ in.

Sect. III. **Trivalvaria,** *Miquel. Inner petals* very concave or vaulted.

23. **P. costata,** *H. f. & T.*; young branches tomentose, leaves oblong or oblong-lanceolate acuminate or acute rigidly coriaceous glabrous above silvery and downy beneath, flowers solitary shortly peduncled. Uvaria costata, *Wall. Cat.* 6480. Guatteria costata, *H. f. & T. Fl. Ind.* 143.

Martaban, *Wallich.*

A tree. *Leaves* 5–6 by 1½–2½ in., base acute, deep green above; nerves oblique, nearly straight, nervules conspicuous. *Peduncles* ¼ in., extra-axillary. *Sepals* ovate, persistent in fruit, subconnate at the base. *Fruit* unknown.—A very imperfectly known species.

24. **P. argentea,** *H. f. & T.*; branches glabrous, leaves oblong-lanceolate acute or acuminate glabrous or both surfaces silvery beneath, peduncles 1–3 on short woody tubercles. Guatteria pallida, *H. f. & T. Fl. Ind.* 143 (*not of Blume*).

Forests of Assam and Silhet, *H. f. & T.*

A shrub; branches spreading, young hardly puberulous. *Leaves* 4–8 by 1¼–2½ in., base rounded or acute, thin, coriaceous; nerves distant, arched; petiole ¼ in. *Flowers* supra-axillary, minute, polygamo-diœcious; ♂ as in *P. macrophylla*, but smaller; ♀ with many densely pubescent ovaries and a few imperfect stamens; bracts many, minute, strigose. *Carpels* many, ¾ in., oblong, granulate, glabrous; stalk ⅓ in.—An apparent congener of *P. macrophylla*, but the flowers are so young that it is hardly useful to introduce the details given in Flora Indica.

25. **P.? aberrans,** *Maingay*; branches glabrous, leaves elliptic-lanceolate taper-pointed membranous glaucous beneath nerves faint, flowers subterminal, petals orbicular-ovate outer largest, carpels small oblong 2-seeded.

Malacca, *Maingay.*

A climbing shrub; branches black, slender. *Leaves* 4–5 by 1¼–1¾ in., rather shining above, nerves spreading reticulate on both surfaces; petiole ⅙ in., slender. *Flowers* 1 in. diam., erect; peduncle 1½ in., slender; bracts minute, median or inframedian. *Sepals* ⅙ in., broad-ovate, obtuse, glabrous. *Outer petals* ⅓ in, pubescent on both surfaces; inner ovate, acute, very concave, tips imbricate in bud. *Ovaries* pilose; cell far above the base; ovules 1–2, superposed. *Carpels* ⅓–½ in., elliptic-oblong, cylindric, smooth, purple, top rounded, walls thin. *Seeds* 2, superposed.—Referred also doubtfully to *Ellipeia* by Maingay, from whose mss. the description of the flower is taken.

GUATTERIA MEMBRANACEA, *A. DC. Mem. Anon.* 41; *H. f. & T. Fl. Ind.* 142, of which there are no specimens in the Wallichian Herbarium, is no doubt a *Polyalthia*, differing from *P. nitida*, apparently only in the slightly pubescent leaves.

11. **ANAXAGOREA,** St. Hilaire.

Trees or shrubs. *Flowers* small, greenish, leaf-opposed. *Sepals* 3, valvate, connate at the base. *Petals* 6, subequal, 2-seriate, valvate, thin, flat. *Torus* convex. *Stamens* indefinite; anther-cells extrorse or sublateral; connective with a terminal process. *Ovaries* few or many; style variable; ovules 2, subbasal, collateral, ascending. *Ripe carpels* follicular; stalk clavate. *Seeds* 1–2, exarillate, testa shining.—DISTRIB. Tropical Asia and America; species about 6.

1. **A. luzonensis,** *A. Gray, Bot. U. S. Expl. Exped.* 27; glabrous, leaves membranous oblong abruptly obtusely acuminate, flowers solitary leaf-opposed, bracts 1–2 amplexicaul. A. zeylanica, *H. f. & T. Fl. Ind.* 144; *Thwaites Enum.* 10; *Beddome Ic. Pl. Ind. Or.* t. 46.

Tropical forests of PEGU, RANGOON, the ANDAMANS, MALACCA, and CEYLON.—DISTRIB. Philippines.

A shrub. *Leaves* 3–6 by $1\frac{1}{4}$–2 in., base acute, light green, paler beneath; nerves distant, oblique; petiole $\frac{1}{4}$ in. *Flowers* 1 in. diam.; peduncle $\frac{1}{4}$ in. *Sepals* ovate, obtuse. *Petals* ovate or oblong. *Stamens* all similar and fertile. *Ovaries* 2–4, ovoid-oblong. *Carpels* $1\frac{1}{2}$ in., spathulate, obtuse, obliquely mucronate, glabrous, rather rugose.—Allied closely to *A. javanica*, Blume, which has 8–10 carpels and elongated inner stamens.

12. **POPOWIA,** Endl.

Trees. *Flowers* small, extra-axillary or leaf-opposed. *Sepals* 3, ovate, valvate. *Petals* 6, valvate in 2 series; outer like the sepals, spreading; inner thick, concave, connivent, acute or tip usually inflexed. *Stamens* indefinite or subdefinite, short, cuneate; anther-cells dorsal, remote. *Carpels* about 6, ovoid; style large, oblong or subclavate, straight or recurved; ovules 1–2 on the ventral suture, rarely 1 basal erect. *Ripe carpels* berried, globose or ovoid, stalked.—DISTRIB. About 8 species, Asiatic, African, and Australian.

1. **P. Beddomeana,** *H. f. & T.*; leaves membranous lanceolate or oblong-lanceolate long acuminate lower ovate acute smooth above granulate and tomentose on the veins beneath, flowers extra-axillary, outer petals larger than the inner. P. ramosissima, *Beddome Ic. Pl. Ind. Or.* t. 75 (*excl. synon.*).

Mountains of TRAVANCOR, *Beddome*.

A much branched tree; young parts densely brown-tomentose. *Leaves* 2–3 by $1\frac{1}{2}$–$2\frac{1}{3}$ in., lower 2 by 1 in., base acute, smooth above; petiole very short. *Flower-buds* $\frac{1}{3}$ in. diam., globose, villous; peduncles $\frac{1}{12}$–$\frac{1}{6}$ in., tomentose; bract median. *Sepals* acute, connate below. *Petals* thick, glabrous inside, densely tomentose outside; outer very broad ovate; inner convex, tip not inflexed; claw broad, short. *Stamens* indefinite. *Ovaries* 4–5; ovules 1–2.

2. **P. ramosissima,** *H. f. & T. Fl. Ind.* 105; leaves ovate or oblong acute glabrous above tomentose on the midrib and veins beneath, flowers leaf-opposed, outer petals smaller than the inner. Guatteria ramosissima, *Wall. Cat.* 7294, 8006.

PENANG, *Wallich.*

A spreading much branched tree; bark glabrous; young parts brown-tomentose. *Leaves* 2–4 by 1–2 in., thin, coriaceous, base rounded; petiole $\frac{1}{12}$ in., tomentose. *Flowers* solitary or geminate, minute, globose; peduncles $\frac{1}{12}$–$\frac{1}{4}$ in.; bract small, submedian. *Sepals* ovate, pilose. *Outer petals* smaller than the sepals, ovate; inner ovate, acute. *Stamens* about 18. *Carpels* many, densely strigose; ovules 1–2.

3. **P. Helferi,** *H. f. & T.;* leaves narrow-oblong abruptly acutely or obtusely acuminate glabrous above puberulous on the midrib beneath, flowers extra-axillary? outer petals smaller than the inner.

King's Island, TENASSERIM, *Helfer.*

A small spreading tree; branchlets coarsely hairy. *Leaves* 2$\frac{1}{2}$–5 by 1–1$\frac{1}{2}$ in., base rounded or suboblique; petiole $\frac{1}{12}$ in., subpilose. *Flowers* minute, globose; peduncles $\frac{1}{12}$–$\frac{1}{4}$ in., tomentose. *Sepals* and (rather larger) *outer petals* ovate, strigose; inner petals orbicular, concave, densely strigose, tip inflexed. *Stamens* 15. *Carpels* 6, densely strigose; ovule solitary, subbasal.—We have examined but one bud.

4. **P. pauciflora,** *Maingay mss.;* branchlets strigose, leaves elliptic-lanceolate finely acuminate membranous minutely granulate midrib and veins beneath sparsely appressed pilose, flowers extra-axillary, outer petals much smaller than the inner, carpels pisiform.

MALACCA, *Maingay.*

Branches slender, dark-grey. *Leaves* 5–7 by 1$\frac{1}{2}$–2 in., base acute, surfaces similar opaque; nerves very oblique; petiole $\frac{1}{10}$ in. *Flowers* $\frac{1}{4}$ in. diam., solitary or in pairs, outside the leaf-axil, rusty-strigose; peduncles $\frac{1}{6}$–$\frac{1}{4}$ in.; bract basal. *Sepals* minute, ovate. *Outer petals* like the sepals, glabrous inside; inner thrice as large, suborbicular, concave, tip inflexed. *Stamens* many. *Ovaries* 6, gibbous, strigose; style subclavate; ovule erect. *Carpels* pisiform, subsessile, glabrous, purple. *Testa* rugose.

5. **P. fœtida,** *Maingay mss.;* branchlets tomentose, leaves elliptic-lanceolate caudate-acuminate glabrous above tomentose beneath, flowers axillary outer petals a little smaller than the inner, carpels very large.

MALACCA, *Maingay.*

A large tree; branches pale, leaves beneath petioles inflorescence and carpels covered with yellow-grey tomentum. *Leaves* 5–7 by 2–2$\frac{1}{2}$ in., base acute, thin firm with midrib above puberulous; nerves many, strong beneath, reaching the margin; petiole $\frac{1}{8}$–$\frac{1}{6}$ in., thickened. *Flowers* $\frac{1}{3}$ in. diam., buds globose; peduncles $\frac{1}{4}$ in. *Sepals* minute, obtuse. *Outer petals* elliptic-ovate, obtuse, yellow; inner smaller, base excavated, margin thick, triquetrous, apiculate. *Stamens* about 30, connective produced backwards. *Ovaries* about 6, strigose, 2-ovuled; style rather slender. *Carpels* 2–3 by 1$\frac{1}{2}$–2 in., sessile, oblong, cylindric, top rounded, 1 seeded. *Seed* 1$\frac{1}{2}$–2 in., oblong; testa bony, smooth.

6. **P. nervifolia,** *Maingay mss.;* branchlets densely tomentose, leaves oblong or elliptic-oblong shortly acuminate substrigose on the short midrib and nerves beneath, flowers extra-axillary 2–3-nate silky villous, outer petals like the sepals half as large as the inner, carpels $\frac{1}{2}$ in.

MALACCA, *Maingay.*

Branches black; branchlets rusty-tomentose. *Leaves* 6–8 by 2–3 in., firm, coriaceous, base subacute, opaque, under-surface pale; nerves prominent, rather remote, very oblique; petiole $\frac{1}{3}$–$\frac{1}{2}$ in., rusty-pubescent. *Flowers* $\frac{3}{4}$ in. diam., peduncles $\frac{1}{4}$–$\frac{1}{3}$ in., stout, clothed with large ovate obtuse clasping hirsute bracts. *Sepals* orbicular-ovate. *Petals* broadly elliptic-ovate, very thick, outer $\frac{1}{3}$ in., inner coriaceous, tip 3-quetrous, glabrous within. *Ovaries* many, slender, hirsute; ovule 1, erect. *Carpels* many, $\frac{1}{2}$ in., elliptic-oblong, smooth, apiculate, walls thin; stalk short stout. *Seed* oblong, testa pale shining.—Allied to *Xylopia* in the conniving triquetrous inner petals (*Maingay*).

7. **P. tomentosa,** *Maingay mss.;* branchlets and leaves beneath softly hirsute, leaves oblong or oblong-lanceolate acute or acuminate puberulous above, base cordate, flowers small extra-axillary softly villous, outer petals larger than the inner.

MALACCA, *Maingay.*

A tree; *branches* black, rugose. *Leaves* 3–5 by 1½–2¼ in., rather thin, opaque, dirty green above, pale and greenish beneath under the soft brown hairs; petiole ⅛ in. *Flowers* ¼ in. diam., subsessile. *Sepals* broad-ovate, connate, hardly larger than the sepals. *Outer petals* suborbicular, very thick, glabrous within; inner smaller, very concave, obovate, connivent. *Torus* flat. *Stamens* about 25. *Ovaries* 7–9, glabrous; style equalling the ovary; ovules 2 superposed. *Ripe? carpels* ½–¾ in. diam., globose, hairy, at length glabrous, smooth, blood red, 2-seeded; stalk ¼ in., stout.

13. OXYMITRA, Blume.

Climbing shrubs. *Leaves* parallel-nerved, nervules transverse, not forming intra-marginal loops. *Flowers* leaf-opposed or extra-axillary. *Sepals* 3, valvate, connate below. *Petals* 6, valvate in 2 rows, outer large, long, flat or triquetrous and narrow, leathery, more or less spreading or connivent; inner much smaller, ovate-lanceolate or oblong (long and narrow in *O. stenopetala* and *glauca*), conniving over the stamens and ovaries. *Stamens* many, linear-oblong or cuneate, truncate; anther-cells dorsal, remote (small and ovoid in *O. glauca*). *Ovaries* oblong, strigose; style oblong or clavate, recurved; ovules 1–2, subbasal, ascending. *Ripe carpels* 1-seeded, stalked.—DISTRIB. About 18 species, Asiatic and African.

1. **O. latifolia,** *H. f. & T. Fl. Ind.* 145; leaves ovate or obovate obtuse, base cordate glabrous above, softly pubescent beneath, peduncles 1-bracteate in the middle, carpels long-stalked pubescent.

PENANG, *Phillips;* MALACCA, *Maingay.*

A large woody climber, branches rusty-tomentose. *Leaves* 6–12 by 4–7 in., coriaceous, shining above, tomentose on the nerves and midrib beneath; petiole ½ in. *Flowers* supra-axillary; pedicel ¼–½ in., rusty tomentose; bracts ovate or oblong. *Sepals* orbicular, connate into a 3-lobed cup. *Outer petals* 1–1½ in., tomentose, ovate-lanceolate, tips triquetrous; inner ½ in., broad-ovate, shortly clawed. *Carpels* red-purple, golden-pubescent. *Ripe carpels* red-purple.

2. **O. Maclellandii,** *H. f. & T.;* leaves oblong-lanceolate acute, base rounded or subcordate, above glabrous except the midrib, beneath glaucous and appressed pubescent, peduncle ebracteate.

RANGOON, *Maclelland,* &c.

A large (climbing?) shrub, young branches appressed-tomentose, old glabrate. *Leaves* 8–10 by 2½–3 in., covered above with microscopic scales, reddish beneath; petiole ⅓ in. *Flowers* supra-axillary, solitary; pedicel ¼ in., appressedly brown-pubescent. *Sepals* ⅓ in., ovate, acuminate. *Outer petals* 1½ in., oblong, obtuse, coriaceous; inner ½–⅝ in., oblong, connivent, flat, with a slight oval basal concavity. *Ovaries* oblong, densely strigose; style oblong.

3. **O. affinis,** *H. f. & T.;* branchlets densely rusty-tomentose, leaves oblong or obovate-oblong obtuse or subacute, base cordate, above opaque and puberulous, beneath glaucous and rusty-pubescent, peduncle bracteate in the middle, sepals foliaceous, carpels elliptic pubescent shortly-stalked.

MALACCA, *Maingay.*

Branches black. *Leaves* 5–9 by 2–3¼ in., thin; nerves rusty pubescent above, beneath distinct spreading; petiole ¼ in. *Flowers* supra-axillary, nodding, solitary, 1 in. long;

peduncle $\frac{1}{4}$ in., short, curved; bracts large, orbicular, veined. *Sepals* $\frac{1}{3}$ in., orbicular-ovate, acute, veined, tomentose, twice as broad and half as long as the ovate-lanceolate triquetrous acute outer petals, which are excavated at the base, pubescent outside, glabrous within. *Inner* petals glabrous, rather shorter than the outer, connate into an acute cone, claw short. *Ovaries* 1-ovuled. *Carpels* $\frac{1}{3}$ in., acute; stalk short.—Near *O. Maclellandii.*

4. **O. stenopetala,** *H. f. & T.;* leaves lanceolate acute at both ends, glabrous above glaucous beneath, petals all long and narrow.

Martaban, *Falconer.*

A woody climber; young branches and flowers appressed-pubescent. *Leaves* 9–12 by 2–3 in. *Flowers* supra-axillary. *Sepals* $1\frac{1}{2}$ in., ovate, acute. *Petals* tapering from an ovate base to a long fine point, outer 2 by $\frac{1}{6}$ in., inner $\frac{1}{4}$ shorter, connivent.—Habit of the genus, but differs in the long inner petals.

5. **O. unonæfolia,** *H. f. & T. Fl. Ind.* 146; leaves oblong abruptly caudate-acuminate glabrous and shining above very glaucous beneath, carpels oblong stalked glabrous. Guatteria unonæfolia, *A. DC. Mem.* 41; *Wall. Cat.* 6435.

Tenasserim, at Tavoy, *Wallich.*

A woody glabrous climber; buds with appressed golden pubescence. *Leaves* 5–7 by 2–3 in., base rounded or subacute; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Peduncles* extra-axillary; flowers imperfect. *Sepals* persistent, broad-ovate, brown-pubescent. *Carpels* 5–6, apiculate, dark-brown; stalk $\frac{1}{4}$ in.—Referred here from its similarity in foliage, &c., to *Oxymitra.*

6. **O. glauca,** *H. f. & T. Fl. Ind.* 146; leaves oblong obtuse or acute at both ends glabrous very glaucous beneath, outer petals very long and narrow, carpels stalked small obtuse at both ends.

Penang, *Phillips;* Malacca, *Maingay.*

A slender glabrous (climbing?) shrub; buds slightly pubescent. *Leaves* 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., base usually rounded. *Sepals* minute, acute, deciduous. *Fruiting peduncles* 1 in., almost leaf-opposed. *Outer petals* 1 in., narrow-linear, triquetrous; inner very small, triquetrous. *Anther-cells* ovoid, top of connective large, trapezoid. *Ovaries* hirsute; ovule 1 erect; style curved, clavate. *Carpels* many, $\frac{1}{3}$ in. diam., subglobose, dark-brown, smooth; stalk as long.

7. **O. fornicata,** *H. f. & T. Fl. Ind.* 146; leaves lanceolate or oblong-lanceolate acute or acuminate glabrous above glaucous and hoary-pubescent beneath, carpels narrow-oblong mucronate short-stalked. Uvaria fornicata, *Roxb. Fl. Ind.* ii. 662. U. Roxburghiana, *Wall. Cat.* 6423 *A* (*not B*).

Forests of Assam, Silhet, Mergui, and Penang?

A climbing shrub, young branches leaves pedicels and carpels brown-tomentose. *Leaves* 4–6 by 1–2 in., base rounded; petiole $\frac{1}{3}$ in. *Flowers* pale yellow, supra-axillary; peduncles $\frac{1}{4}$–$\frac{3}{4}$ in.; bract median, oblong, deciduous. *Sepals* $\frac{1}{2}$–$\frac{3}{4}$ in., ovate-lanceolate, membranous, veined, appressed-pubescent. *Outer petals* 2 in., oblong-lanceolate, thin, tomentose, about 5-nerved; inner $\frac{1}{3}$ in., ovate, acute, connivent. *Carpels* $\frac{2}{3}$–$\frac{3}{4}$ in., stalk very short, stout.

8. **O. filipes,** *H. f. & T.;* branchlets slender and leaves beneath hirsute, leaves oblong or oblong-lanceolate acuminate, peduncles very long filiform, flowers very slender.

Malacca, *Maingay.*

A climbing shrub; branches brown, clothed with soft spreading hairs. *Leaves* 4–6 by $1\frac{1}{4}$–2 in., thin, base cordate, opaque above with slender puberulous veins, hardly glaucous beneath; petiole $\frac{1}{4}$ in. *Flowers* 2–$2\frac{1}{2}$ in. long; peduncles 3-4 in., supra-axillary, puberulous; bracts minute, median. *Sepals* ¼ in., ovate, acute, rusty-pubescent. *Outer petals* with a short broad concave base, and almost filiform pubescent blade; inner ⅓ in., oblong, subulate-acuminate. *Ovaries* silky; style short, stigma clavate; ovule 1. *Carpels* ⅓ in., elliptic, beaked, red, walls thin, pubescent; stalk ¼ in.

14. **PHÆANTHUS,** H. f. & T.

Trees or climbers. *Flowers* solitary terminal or in extra-axillary fascicles. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 rows; outer small like the sepals; inner large, flat, coriaceous. *Stamens* numerous, narrow-oblong, truncate or capitate, anther-cells dorsal, distant. *Carpels* numerous; style clavate, grooved ventrally. *Ovules* 1–2, subbasal, ascending. *Ripe carpels* stalked, 1-seeded.—DISTRIB. Species 3, Malayan.

1. **P. nutans,** *H. f. & T. Fl. Ind.* 147; leaves oblong or lanceolate acute or acuminate glabrous above except the midrib softly pubescent beneath, carpels oblong puberulous stalked. Uvaria nutans, *Wall. Cat.* 6481. U. tripetala, *Roxb. Fl. Ind.* ii. 667. U. ophthalmica, *Roxb. ex Don. Gen. Syst.* i. 93.

MALACCA and SINGAPORE, *Wallich*, &c.—DISTRIB. Moluccas.

A climber; young branches brown-tomentose. *Leaves* 4–6 by 1½–2¼ in., base acute; petiole ⅓ in., pubescent. *Flowers* terminal or lateral, solitary or 2–3 together, fetid, yellowish, purple at the base inside; peduncles 1-2 in., tomentose; bracts several, small, linear. *Inner petals* ¾–1 in., ovate-oblong, pubescent, 5–7-ribbed. *Carpels* ¼ in., beaked; stalks equal their length.

? 2. **P. malabaricus,** *Beddome Ic. Pl. Ind. Or.* t. 76; leaves oblong-lanceolate taper-pointed glabrous except the midrib below, flowers axillary or extra-axillary solitary.

Wynaad jungles, MALABAR, *Beddome.*

Young part ferruginous. *Leaves* 4–7 by 1-2 in., base rounded or cordate; petioles very short, pubescent. *Flowers* ½–¾ in. diam., red; peduncles ⅓–½ in.; bracts 2, minute, basal. *Sepals* orbicular-ovate, acute. *Outer petals* twice as large as the sepals, narrower; inner twice as large as the outer, cymbiform, fleshy, inflexed tips contiguous. *Style* short, clavate; ovules 1–2 on the ventral suture.—Foliage of *Goniothalamus.*

15. **GONIOTHALAMUS,** Blume.

Small trees or shrubs. *Leaves* with small nerves, forming intramarginal loops. *Flowers* solitary or fascicled, axillary or extra-axillary; peduncles with basal scaly distichous bracts. *Sepals* 3, valvate. *Petals* 6, valvate in 2 series; outer thick, flat; inner smaller, shortly clawed, cohering in a vaulted cap over the stamens and ovary. *Stamens* many, linear-oblong; anther-cells remote, dorsal, connective produced into an oblong or truncate process. *Ovaries* many; style simple or 2-fid; ovules solitary or 2 superposed, subbasal. *Ripe carpels* 1-seeded.—DISTRIB. About 14 species, natives of Eastern tropical Asia and its islands.

A very difficult genus (reduced to *Oxymitra*, in Baillon's Hist. des Plantes, 237), many species of which require further study. The dimensions of the flower increase rapidly, and those given in the diagnosis are supposed to be the mature ones.—Thwaites' sectional characters taken from the persistence of the calyx and form of the style are probably the best, but not available in all the specimens at our disposal.

I. Outer petals glabrous or very slightly pubescent.

† *Leaves oblong or lanceolate; outer petals* 1½ *in. or more.*

1. **G. Thwaitesii,** *H. f. & T. Fl. Ind.* 106; leaves glabrous oblong obtusely acuminate, peduncles axillary, sepals broadly ovate obtuse per-

sistent, outer petals broadly clawed, style subulate, carpels ovoid shortly stalked. *Thwaites Enum.* 7; *Beddome Ic. Pl. Ind. Or.* t. 58.

Travancor, *Wight;* Ceylon, alt. 2–4000 ft.
A small tree; branches glaucous, leafy; buds brown-pubescent. *Leaves* 3½–6 by 1¼–2½ in., coriaceous, dark-green above, paler beneath, margins subrecurved, nerves subdistant; petiole ¼–⅓ in. *Flowers* green; peduncles ⅔–1 in., subclavate. *Sepals* ½ in., glabrous, reticulate when dry. *Outer petals* 1¼–1½ in., glabrous, ovate-lanceolate, tapering to a rather obtuse tip; inner subsericeous; cone of tips acute, ⅓ in. *Carpels* ½–⅔ in., obtuse at both ends.

2. **G. Gardneri,** *H. f. & T. Fl. Ind.* 107; leaves narrow lanceolate glabrous, peduncles 1–2 axillary, sepals ovate acute persistent, outer petals hardly clawed, style subulate, carpels oblong subglabrous short-stalked.—*Thwaites Enum.* 7; *Beddome Ic. Pl. Ind. Or.* t. 60.

Ceylon; in forests, alt. 2–4000 ft., *Walker*, &c.
A shrub, 8–10 ft.; branches leafy, glabrous; buds brown-pubescent. *Leaves* 5–10 by 1–2 in., coriaceous, dark-green and shining above, pale beneath, nerves close set; petiole ¼–½ in. *Flowers* yellow-green; peduncles ¼–½ in. *Sepals* glabrous, reticulate when dry. *Outer petals* glabrous, oblong-lanceolate, longer and narrower than in *G. Thwaitesii.* *Carpels* 1 in.; style subulate.

3. **G. Griffithii,** *H. f. & T. Fl. Ind.* 110; leaves oblong obtusely acuminate glabrous, peduncles axillary recurved, sepals large obtuse or subacute persistent?, outer petals long-acuminate scarcely clawed, style subulate, carpels subglobose glabrescent short-stalked.

Mergui, *Griffith.*
A tree; branches glabrous, black or grey. *Leaves* 6–12 by 2½–3 in., coriaceous, base acute, shining above, paler beneath; petiole ½ in. *Peduncles* ½ in., axillary or from the old wood. *Sepals* ½–¾ in., thin, reticulate when dry, connate below. *Outer petals* 2–2½ in., glabrous, lanceolate from a broad base; inner ½–⅔ in.; cone sharp, triquetrous. *Anthers* with an acute process. *Ovaries* strigose; style long, subulate. *Carpels* ½ in. diam.

4. **G. Hookeri,** *Thwaites Enum.* 6; leaves oblong or ovate-oblong shortly obtusely acuminate glabrous, peduncles axillary or cauline, sepals broad acute persistent, outer petals not clawed, style subulate, carpels ovoid short-stalked.—*Beddome Ic. Pl. Ind. Or.* t. 66.

Ceylon; Hinidoon and Reigam Corles, alt. 1000 ft., *Thwaites.*
A small tree; branches glabrous. *Leaves* 6–13 by 2½–5 in., thick, coriaceous, base acute or rounded, paler beneath; petiole ½–¾ in. *Flowers* pale green, solitary or fascicled; peduncles ¼–¾ in. *Sepals* ¾ in., connate below, reticulate when dry. *Outer petals* 2 in., glabrous, broad-lanceolate, base rounded, slightly contracted above the middle; inner tomentose within, cone ¾ in. high. *Carpels* size of a small bean.

†† *Leaves oblong or lanceolate; outer petals* 1 *in. or less.*

5. **G. sesquipedalis,** *H. f. & T. Fl. Ind.* 108; leaves linear-oblong or lanceolate abruptly obtusely acuminate glabrous margin recurved when dry, sepals ovate acute persistent, outer petals lanceolate, cone of inner long, carpels ovoid glabrous very short-stalked. Guatteria sesquipedalis, *Wall. Pl. As. Rar.* iii. t. 266; *Cat.* 6446. O. macrophylla, *A. DC. Mem.* 42 (*not of Blume*) *Wall. Cat.* 6451.

From Sikkim to Assam, and the Khasia hills to Tenasserim.
A glabrous shrub, 2–4 ft. *Leaves* 9–13 by 2–3½ in., coriaceous, minutely pellucid-punctate, shining above, paler beneath; petiole ½ in. *Flowers* greenish-yellow; peduncles $\frac{1}{12}$–¼ in., axillary or supra-axillary. *Sepals* ¼ in., glabrous. *Outer petals* 1 in.,

lanceolate, glabrous; inner pubescent, cone $\frac{3}{4}$ in. *Ovaries* golden-strigose, narrow, equalling the cylindric recurved style. *Carpels* 3–4 or 8–10, $\frac{2}{3}$ in., mucronate, granulate, orange-red.

6. **G. Walkeri,** *H. f. & T. Fl. Ind.* 109; leaves narrowly linear-oblong obtusely acuminate glabrous, peduncles axillary, sepals ovate acute persistent, outer petals ovate-lanceolate, style clavate 2-lobed.—*Thwaites Enum.* 8 and 398.

CEYLON; in the Singhe Rajah forest, *Walker*, &c.

A small tree; branches glabrous. *Leaves* 10–13 by 2–5 in., coriaceous, base acute, very aromatic, dark green and shining above, pale beneath. *Flowers* red, sparsely pubescent; peduncles $\frac{1}{12}$–$\frac{1}{6}$ in., axillary. *Sepals* $\frac{1}{6}$ in., enlarging in fruit. *Outer petals* $\frac{2}{3}$ in.; inner $\frac{1}{3}$–$\frac{1}{2}$ in.—"The fragrant roots contain camphor and are chewed by the Cinghalese." *Thw.*—Very near to *G. sesquipedalis.* The description of the flower is taken from Thwaites.

††† *Leaves obovate-oblong, widening upwards to above the middle.*

7. **G. Thomsoni,** *Thwaites Enum.* 7; leaves obovate-oblong abruptly long-acuminate glabrous, flowers solitary or binate axillary or truncal, sepals acute persistent, outer petals $1\frac{1}{2}$ in. lanceolate, style with 2 filiform segments, carpels ovoid short-stalked. *Beddome Ic. Pl. Ind. Or.* t. 59.

CEYLON; forests between Galle and Ratnapoora, *Thwaites.*

A small glabrous bush, $1\frac{1}{2}$–3 ft. *Leaves* 6–12 by $1\frac{1}{2}$–$3\frac{1}{2}$ in., base acute, bright green above, pale beneath; petiole $\frac{1}{2}$ in. *Flowers* yellow, glabrous, often close to the ground; peduncles $\frac{1}{2}$–$\frac{3}{4}$ in., slender, tip decurved. *Sepals* $\frac{1}{4}$ in., lanceolate. *Outer petals* $1\frac{1}{2}$ in., taper-pointed, base rounded; cone of inner broad, $\frac{1}{2}$ in. high. *Ovaries* elongate, equalling the style. *Carpels* $\frac{1}{2}$ in., 1-seeded.

8. **G. wynaadensis,** *Beddome Ic. Pl. Ind. Or.* i. 13, t. 61; leaves narrowly obovate-oblong abruptly acuminate glabrous, peduncles axillary or truncal, sepals persistent? outer petals $\frac{1}{2}$ in. broad ovate, style elongate 2-lobed, carpels oblong. Atrategia, *Beddome.*

WESTERN PENINSULA; Wynaad, alt. 2500–5000 ft., *Beddome.*

An erect shrub; shoots puberulous. *Leaves* 8–11 by 3 in., thin, membranous, base acute, shining above, paler beneath; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Flowers* $\frac{3}{4}$–1 in. long, glabrate; buds brown-pubescent; peduncles $\frac{1}{6}$–$\frac{1}{4}$ in. *Sepals* orbicular, obtuse or acute. *Outer petals* conspicuously veined; inner half as long, vaulted. *Torus* and *ovaries* hairy; ovule 1. *Ripe carpels* $\frac{1}{2}$–1 in. long, mucronate; stalk $\frac{1}{8}$ in.—We have seen but one specimen.

9. **G. macrophyllus,** *H. f. & T.*; leaves narrow-obovate-oblong acuminate glabrous coriaceous, peduncles supra-axillary, sepals acute persistent, outer petals 1–$1\frac{1}{2}$ in. oblong-lanceolate, style slender, carpels pisiform subsessile.—Polyalthia macrophylla, *Blume Fl. Jav. Anon.* 79, t. 39.

MALACCA, *Griffith, Maingay.*—DISTRIB. Java.

A shrub or tree; branches glabrous; bark grey. *Leaves* 10–18 by 3–5 in., coriaceous, base rounded or acute, pale beneath; petiole $\frac{3}{4}$–1 in. *Flowers* green, glabrous; peduncles $\frac{1}{4}$–$\frac{1}{2}$ in., glabrous. *Petals,* outer acute or acuminate; inner obtuse, ciliate, cone $\frac{1}{3}$ in., depressed, triquetrous. *Ovaries* 12–18, glabrous, 1-ovuled. *Carpels* size of a pea, ovoid, mucronate.—Our specimens are in fruit with a bud.

II. Outer petals softly pubescent or tomentose.

* *Leaves oblong or obovate-oblong.*

10. **G. Simonsii,** *H. f. & T. Fl. Ind.* 108; leaves narrowly obovate-oblong caudate-acuminate glabrous above brown pubescent beneath, peduncles axillary, sepals acute persistent, style cylindric, carpels oblong.

KHASIA HILLS; alt. 2–3000 ft., *Simons*, &c.

A small tree; young branches, midrib and nerves beneath, peduncles and petals brown-tomentose. *Leaves* 9–15 by 3–5 in., nerves strong; petiole ½ in. *Flowers* 1–1½ in. long; peduncles ¼–⅓ in. *Sepals* ½ in., ovate. *Outer petals* 1½–2 in. long, oblong-lanceolate; cone of inner ½ in. long, triquetrous, acute. *Connective* acute, glabrous. *Carpels* ½ in., on a much elongated torus, mucronate.

11. **G. giganteus,** *H. f. & T. Fl. Ind.* 109: leaves oblong long and obtusely acuminate glabrous above puberulous beneath with a sharply keeled midrib, peduncles from the old axils, sepals broadly ovate obtuse, outer petals flat, style filiform, tip clavate.—Uvaria gigantea, *Wall. Cat.* 6469 A B (*in part*).

PENANG and SINCAPORE, *Wallich*, &c.—DISTRIB. Philippines.

Branches glabrous, white; buds brown-tomentose. *Leaves* 6–10 by 1¾–3 in., coriaceous, base acute, dark green and shining above, pale beneath; petiole ½ in. *Flowers* very large; peduncles 1–1½ in., subclavate, spreading or pendulous, puberulous. *Sepals* ⅔ in., ovate, subobtuse, pubescent. *Outer petals* 3–4 by 1½–3 in., oblong, shortly clawed, pubescent on both surfaces; inner densely golden tomentose, cone ⅔ in.

12. **G. malayanus,** *H. f. & T. Fl. Ind.* 107: leaves narrow-oblong taper-pointed glabrous, peduncles axillary solitary, sepals connate to the middle acute, outer petals flat, style slender, carpels narrow-oblong glabrate stalked. Uvaria sp. *Griff. Notul.* iv. 710.

MALACCA, *Griffith.*

Bark white; shoots brown-tomentose. *Leaves* 6–9 by 1½–3 in., base acute or rounded, shining and dark green above, paler and lurid beneath, veins subhorizontal, faint; petiole ¼–⅓ in. *Flowers* greenish; peduncles ⅓–⅔ in., deflexed, brown-silky. *Sepals* ¼ in., broad ovate, pubescent. *Outer petals* 1 in., ovate-lanceolate, acute, clawed, young silky on both surfaces with a triangular glabrous basal area, back keeled; inner united into a short acute tomentose cone. *Ovaries* silky; ovules 3–5. *Carpels* 1 in., corky (golden-pubescent when immature); stalk ¼ in. *Seeds* 1–3, testa hispidulous; funicle broad, flat.—*G. Stingelandtii*, Scheffer, of Java, is perhaps the same.

13. **G. fulvus,** *H. f. & T.;* leaves narrowly obovate-oblong obtuse or acute glabrous, peduncles axillary solitary, sepals free subacute, outer petals flat, style cylindric glabrous.

MALACCA, *Griffith.*

Branches slender, black. *Leaves* 8–9 by 2½–3½ in., thin, glabrous, pellucid-dotted, base acute, nerves oblique; petiole ¼ in., appressed-pubescent. *Flowers* 1 in. long; peduncles ¼ in., puberulous. *Sepals* ⅓ in., broad ovate. *Outer petals* 1½–2 in., lanceolate from a broad base, taper-pointed, brown-silky, slightly keeled on the back; cone ⅓ in., short, triquetrous, obtuse.—Flower of *G. malayanus;* leaves more like *G. Simonsii.*

14. **G. cardiopetalus,** *H. f. & T. Fl. Ind.* 107; leaves narrow-oblong or obovate-oblong abruptly acuminate glabrous margin waved, peduncles supra-axillary solitary or superposed, sepals orbicular free, outer petals cucullate clawed, style slender 2-fid. *Beddome Ic. Pl. Ind. Or.* t. 62. Uvaria obovata, *Heyne ex Wall. Cat.* 6471. Polyalthia cardiopetala, *Dalz. in Hook. Kew Jour. Bot.* ii. 39. Atrategia Thomsoni, *Bedd.*

Mountains of CANARA, *Heyne*, &c.

A small tree; branches slender, leafy. *Leaves* 6–9 by 2–3 in., thin, coriaceous, base acute; petiole ⅓ in. *Flowers* 1 in. diam.; peduncles ¼–½ in. *Sepals* small, pubescent. *Outer petals* ½–⅔ in., oblong, densely brown-tomentose; inner ⅓ shorter, tomentose.

** *Leaves lanceolate.*

15. **G. reticulatus,** *Thwaites Enum.* 7, 398; leaves lanceolate or very narrowly oblong acuminate glandular-dotted glabrous above sparsely strigose

beneath, peduncles supra-axillary, sepals broad ovate acute deciduous, style clavate 2-lobed, carpels oblong or globose rusty-pubescent. *Beddome Ic. Pl. Ind. Or.* t. 64.

CEYLON; forests between Galle and Ratnapoora, *Thwaites.*

A shrub, 6–8 ft.; bark black, young branches strigose. *Leaves* 6–11 by 1–2$\frac{1}{4}$ in., membranous, reticulate; petiole $\frac{1}{4}$ in., deeply grooved, almost winged. *Flowers* $\frac{3}{4}$ in. long, red- or yellow-brown; pedicels $\frac{1}{4}$ in., very slightly supra-axillary, deflexed. *Ovaries* densely red-strigose, style large. *Carpels* $\frac{1}{2}$ in. long, acute, 1–2-seeded; stalk $\frac{1}{6}$ in.

16. **G. salicinus,** *H. f. & T. Fl. Ind.* 106; leaves narrow-lanceolate acuminate glandular-dotted glabrous above sparsely strigose beneath, peduncles shortly supra-axillary, sepals deciduous, style 2-lobed. *Thwaites Enum.* 7; *Beddome Ic. Pl. Ind. Or.* t. 65.

CEYLON; in forests near Adam's Peak, alt. 2–3000 ft.

A shrub, 10–12 ft.; branches dark, slender, leafy; young parts, petioles, pedicels, and sepals densely brown-strigose. *Leaves* 3–4$\frac{1}{2}$ by $\frac{1}{2}$–1 in.; petiole $\frac{1}{4}$ in. *Flowers* yellow-brown or -red; peduncles $\frac{1}{4}$ in. *Sepals* $\frac{1}{4}$ in., ovate, acuminate. *Outer petals* $\frac{1}{2}$–$\frac{2}{3}$ in., oblong-lanceolate, tomentose; cone of inner $\frac{1}{4}$ in. high.

17. **G. Wightii,** *H. f. & T. Fl. Ind.* 106; leaves lanceolate acute at both ends glabrous on both surfaces pellucid-dotted, peduncles axillary, sepals persistent, outer petals ovate acute, style oblong tip dilated, carpels oblong glabrous. *Wall. Cat.* 9089; *Beddome Ic. Pl. Ind. Or.* t. 63.

Forests of TRAVANCOR, *Wight,* &c.

Branches glabrous, leafy, buds sub-silky. *Leaves* 3–5 by $\frac{3}{4}$–1$\frac{1}{4}$ in., thin, bright-green above, brownish beneath; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Flowers* $\frac{1}{2}$ in. diam., peduncles $\frac{1}{2}$–1 in., subclavate. *Sepals* $\frac{1}{5}$ in., broad-ovate, subacute, puberulous. *Outer petals* 1 in., appressed brown-pubescent; inner $\frac{1}{3}$ in., cone short, brown silky inside. *Carpels* $\frac{2}{3}$ in.; stalk $\frac{1}{6}$ in.

16. **MITREPHORA,** Blume.

Trees. *Leaves* coriaceous, strongly ribbed, plaited in vernation. *Flowers* usually terminal or leaf-opposed, sometimes 1-sexual. *Sepals* 3, orbicular or ovate. *Petals* 6, 2-seriate, valvate; outer ovate, thin, veined; inner clawed, vaulted and cohering. *Stamens* oblong-cuneate; above anther-cells dorsal, remote. *Carpels* oblong; style oblong or clavate, ventrally furrowed; ovules 4 or more, 2-seriate. *Ripe carpels* globose or ovoid, stalked or subsessile.—DISTRIB. Species about 10; tropical Asiatic.

1. **M. tomentosa,** *H. f. & T. Fl. Ind.* 113; leaves ovate or oblong-lanceolate obtuse acute or acuminate, glabrous and shining above except the hairy midrib, softly tomentose beneath, flowers cymose shortly pedicelled bisexual leaf-opposed, carpels subglobose tomentose long-stalked.

From ASSAM, *Jenkins;* to CHITTAGONG, *H. f. & T.*

Branchlets tomentose. *Leaves* 3–6 by 1$\frac{1}{2}$–3 in., base rounded, finely reticulate beneath; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Cymes* few-flowered, densely tomentose; bracts basal, large, orbicular; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in.; bracteole submedian. *Flowers* 2 in. diam. *Sepals* broad-ovate, acute. *Outer petals* 1 in., acute; inner broad ovate. *Carpels* 1 in. diam.; pedicel 1–1$\frac{1}{2}$ in.

2. **M. obtusa,** *Blume Fl. Jav. Anon.* 32, t. 10 and 14 C; branches glabrescent, leaves ovate or oblong acute or mucronate glabrate beneath, flowers long-pedicelled 2-sexual on terminal and leaf-opposed tomentose peduncles, carpels as in *M. tomentosa* but smaller. *H. f. & T. Fl. Ind.* 113. Uvaria obtusa, *Blume Bijd.*; *Wall. Cat.* 6484.

Penang, *Wallich;* Malacca, *Maingay.*—Distrib. Java.

A tall much branched tree. *Leaves* 2–5 by 1–2½ in., coriaceous, base rounded, young pubescent beneath and on the midrib above, old glabrous and shining on both surfaces. *Flowers* 1 in. diam., bracts several, distichous, linear; pedicels 1–2 in., slender; bracteole minute, supra-median. *Outer petals* ½ in., yellowish, veins purple, velvety outside; inner smaller, ovate, obtuse, pubescent outside, densely tomentose inside, claw slender.

3. **M. Heyneana,** *Thwaites Enum.* 8; leaves ovate-lanceolate narrowed to an obtuse tip glabrous shining above, flowers 2-sexual shortly pedicelled solitary or in leaf-opposed subracemose cymes, carpels ovoid or subglobose subsessile. *Beddome Ic. Pl. Ind. Or.* t. 77. Uvaria Heyneana, *Wall. Cat.* 6463. U. lutea β, *W. & A. Prodr.* 8. Orophea Heyneana, *H. f. & T. Fl. Ind.* 110.

Carnatic, at Courtalam, *Heyne*, &c., and Ceylon, *Thwaites.*

Branches glabrous; buds pubescent. *Leaves* 2–4 by 1–1½ in., firm, coriaceous, base rounded, finely reticulated beneath; petioles ⅙–¼ in. *Flowers* 1½ in. diam.; peduncle very short; bracts minute distichous; pedicels ¼ in., bracteole small, appressed. *Sepals* minute, orbicular. *Outer petals* ⅔ in., yellow, cuneate-lanceolate, taper-pointed, downy on both sides; inner yellow with red spots, ½ in. long, trapezoid, acute, villous. *Carpels* 6–9, ½ in., strigose in flower, hoary when ripe, 1–3-seeded.

4. **M.? excelsa,** *H. f. & T. Fl. Ind.* 114; young parts stellate-pubescent, leaves obovate-oblong acute shining above pubescent beneath, flowers small 2-sexual shortly pedicelled in short cymes in the old axils. Uvaria excelsa, *Wall. Cat.* 6477.

Penang, *Wallich.*

Leaves 6–8 by 2–3½ in., base cordate, finely reticulate beneath, nerves oblique, conspicuous; petiole ¼ in. *Flowers* small, white, in 2–3-flowered cymes, tomentose. *Sepals* orbicular. *Outer petals* very thick, broad ovate, acute; inner thick, arched, rather contracted at the base.—Genus doubtful, the flowers being immature.

5. **M. reticulata,** *H. f. & T.;* leaves narrowly obovate-oblong obtusely acuminate glabrous above except the midrib puberulous beneath, flowers monœcious, pedicels fascicled axillary, carpels globose. Uvaria reticulata, *Blume Fl. Jav. Anon.* 50, t. 24. Pseuduvaria reticulata, *Miq. Fl. Ind. Bat.* i. pt. 2. 33.

Tenasserim, *Helfer.*—Distrib. Java.

A small tree, 25 ft.; young branches hoary. *Leaves* 4–8 by 1½–2½ in., base acute, conspicuously reticulate beneath, nerves parallel; petiole ⅙–¼ in. *Pedicels* 3–6, slender, ½–1½ in, pubescent; bracts basal; bracteole median, minute, ovate. *Sepals* minute, ovate, obtuse. *Petals*, outside and margins tomentose, outer very small, subacute; inner ¼ in., trapezoid; claw narrow, erect. ♀ with 6 staminodes in 3 pairs. *Ovaries* pilose, 4-ovuled. *Carpels* 4-seeded.—Helfer's specimens differ from Blume's figure only in the rather longer petiole, all are male (like Blume's), but Maingay says the species is monœcious.

6. **M. Maingayi,** *H. f. & T.;* branchlets buds and peduncles rusty-pubescent, leaves oblong or elliptic-oblong acuminate glabrous shining above, flowers 2-sexual long-peduncled, bract concave median, carpels ovoid stalked.

Malacca, *Maingay.*

A small tree. *Leaves* 3–7 by 1¼–2½ in., rather rigid, pale, base rounded or acute, minutely reticulate, nerves strong beneath arching upwards; petiole ¼–½ in., pubescent. *Flowers* 1½ in. diam., cernuous, yellow with red blotches; buds globose, brown-villous; peduncles ⅔–1 in., ascending, slender, and small broad sepals brown-tomentose. *Petals* pubescent; outer 1 in., obovate-oblong, shortly broadly clawed, undulate; inner much smaller, cordate; claw long-linear. *Torus* urceolate pilose. *Ovaries* pilose, 8–10-ovuled, style clavate. *Carpels* (unripe) ¾ in., rusty-tomentose, top rounded; stalk ⅓–½ in., stout.

7. **M. grandiflora,** *Beddome Ic. Pl. Ind. Or.* t. 101; young parts golden-pubescent, leaves elliptic or ovate-lanceolate shining above glabrescent beneath, peduncles 2–3-flowered leaf-opposed, flowers 2-sexual, carpels globose.

Ghats near Coloor and Gairsoppah, in S. CANARA, *Beddome.*

A handsome tree. *Leaves* 4–5 by 1½–2½ in., thin, coriaceous, axils of nerves beneath hairy and glandular; petiole ½ in. *Flowers* 2–3 in. diam., ferruginous, subsessile; buds globose; bract close to flower. *Sepals* small. *Outer petals* broadly elliptic, acute, first white, turning yellow; inner smaller, deciduous, claw broad, back triangular, white streaked with red. *Carpels* globose, size of a hazel, 1-seeded, tomentose.—We have seen no specimen.

16.* ANONA, Linn.

Trees or shrubs. *Flowers* solitary or fascicled, terminal or leaf-opposed. *Sepals* 3, small, valvate. *Petals* 3–6, valvate in 2 series, or the inner series wanting; outer triquetrous, base concave. *Stamens* numerous; anther-cells narrow, dorsal, contiguous, top of connective ovoid. *Ovaries* many, subconnate; style oblong; ovule 1, erect. *Ripe carpels* confluent into a many-celled ovoid or globose many-seeded fruit.—DISTRIB. A large American and African genus, of which various fruiting species or varieties are naturalized in the Old World.

A. squamosa, *Linn.; DC. Prodr.* i. 85; leaves oblong obtuse or acuminate glaucous beneath and pubescent when young, fruit tubercled. *Roxb. Fl. Ind.* ii. 657; *W. & A. Prodr.* 7; *Wall. Cat.* 6490; *H. f. & T. Fl. Ind.* 115; *Rheede Hort. Mal.* iii. 29.

Naturalized especially in the WESTERN PENINSULA.—DISTRIB. Tropical America.—(The Custard Apple of India, and Sweet Sop of the W. Indies.)

A small tree. *Leaves* 2–3 by ¾–1½ in., membranous, usually obtuse, base acute. *Flowers* solitary 1 in. long, pubescent. *Petals* 3, narrow-oblong. *Fruit* fleshy, areolate.

A. reticulata, *Linn.; DC. Prodr.* i. 85; leaves oblong or oblong-lanceolate quite glabrous smooth or roughish beneath, fruit smooth lightly areolate. *Roxb. Fl. Ind.* iii. 657; *Wall. Cat.* 6489; *W. & A. Prodr.* 7; *H. f. & T. Fl. Ind.* 115; *Rheede Hort. Mal.* iii. t. 30, 31.

Naturalized in BENGAL and elsewhere. DISTRIB. Tropical America. (Bullock's-heart or Custard Apple of the W. Indies.)

A small tree. *Leaves* 5–8 by 1½–2 in., base acute; petiole ½ in. *Flowers* 2–3 together on lateral peduncles. *Outer petals* as in *A. squamosa;* inner very small, narrow-oblong. *Fruit* subglobose, roughish outside, with pentagonal areoles.

17. MELODORUM, Dunal.

Climbing shrubs. *Leaves* with strong parallel nerves. *Flowers* terminal axillary and leaf-opposed, solitary fascicled or panicled; buds triquetrous. *Sepals* 3, small, valvate, connate below. *Petals* 6, valvate in 2 rows; outer plano-convex or trigonous; inner triquetrous above, hollowed below on the inner face. *Stamens* many; anther-cells dorsal, contiguous; top of connective ovoid or quadrate. *Carpels* many, free; style oblong; ovules 2 or more.

Ripe carpels berried.—Distrib. Species about 18; Tropical Asia and Africa.

Sect. I. **Melodorum** proper. *Outer petals* oblong-ovate or ovate-lanceolate. *Ovaries* tomentose; ovules many. *Seeds* smooth, often with a raised marginal wing.

* Leaves very pubescent or tomentose beneath.

† *Leaves pubescent on both surfaces.*

1. **M. rubiginosum,** *H. f. & T. Fl. Ind.* 116; leaves oblong obtuse acute or abruptly acuminate glabrous except the tomentose midrib above, pubescent beneath, outer petals 1–1¼ in. narrow-oblong, carpels ovoid or globose tomentose stalked. Uvaria rubiginosa, *A. DC. Mem.* 26; *Wall. Cat.* 6465. U. nervosa *and* U. fulva, *Wall. Cat.* 6479, 6427.

From Silhet and Chittagong, *H. f. & T*, to Tenasserim, *Wallich.*

A large climber; branchlets brown-tomentose. *Leaves* 3–12 by 2–5 in., rather membranous; petiole ½–1 in. *Flowers* axillary or in terminal 5–6 flowered leafless panicles, brown-tomentose; pedicels 1–1¼ in.; bracts 1–2, supra-median, small, ovate. *Sepals* short, broad. *Outer petals* oblong, acuminate, tomentose outside, hoary within; inner narrower, ovate, base concave, limb triquetrous. *Carpels* 1–1¼ in.; stalk as long or longer. *Seeds* shining.

2. **M. latifolium,** *Dunal; H. f. & T. Fl. Ind.* 117; leaves ovate or oblong obtuse coriaceous densely pubescent beneath, outer petals ¾ in. oblong-ovate, carpels large ovoid beaked, stalks thick. *Wall. Cat.* 9411. M. mollissimum, *Miquel Fl. Ind. Bat. Suppl.* i. 354. Uvaria latifolia, *Blume Fl. Jav. Anon.* t. 15.

Malacca, *Griffith;* Singapore, *Maingay.*—Distrib. Sumatra, Java, Philippines.

Very near *M. rubiginosum,* but leaves very coriaceous, more tomentose and obtuse, young downy above, flowers smaller broader and shorter, in larger panicles. *Carpels* 3 in., oblong, densely rusty-tomentose, young warted beaked, old smooth; stalks longer.

3. **M. lanuginosum,** *H. f. & T. Fl. Ind.* 117; leaves lanceolate or oblong-lanceolate acute or acuminate rarely obtuse glabrous except the midrib above densely woolly beneath, outer petals 1½–2 in. villous, carpels globose tomentose. Uvaria lanuginosa, *Wall. Cat.* 6454.

Penang and Singapore, *Wallich;* Malacca, *Maingay.*

A rambling shrub, densely brown-tomentose. *Leaves* 6–8 by 1¾–2¾ in., lower on the branches smaller, base rounded; petiole ½–⅔ in. *Flowers* terminal or leaf-opposed, in short 3–4-flowered cymes; bracts small, oblong, deciduous; pedicels ½–1 in., bracteole ovate basal. *Sepals* ½ in., ovate. *Outer petals* oblong, tapering to an obtuse point; inner a little shorter, hoary, narrow, base concave, limb long triquetrous. *Carpels* 1 in. diam.; stalk ½ in. *Seeds* dimidiate-oblong, shining.

4. **M. manubriatum,** *H. f. & T. Fl. Ind.* 118; leaves 3–5 in. oblong or oblong-lanceolate acute or acuminate glabrous except the midrib above, densely brown-tomentose beneath, outer petals ⅔–1 in., carpels subglobose densely tomentose. Uvaria manubriata, *Wall. Cat.* 6456.

Penang and Malacca, *Wallich,* &c.

A woody climber, young branches petioles inflorescence and carpels densely brown-tomentose. *Leaves* 3–5 by 1¼–1¾ in., base rounded; petiole ¼ in. *Flowers* 1–3, fascicled, terminal or leaf-opposed, pedicels ½–¾ in.; bracts oblong, infra-median. *Sepals* nearly ¼ in., ovate, acute. *Outer petals* ovate-oblong, obtuse; inner a little shorter, dull purple, ovate-lanceolate, hoary, glabrous within. *Carpels* ½–¾ in., obtuse; stalk rather longer.

5. **M. verrucosum,** *H. f. & T. Fl. Ind.* 119; leaves 3–5 in. oblong or lanceolate acute or obtuse glabrous except the midrib above, softly pubescent beneath, nerves close-set, carpels subglobose densely warted.

KHASIA HILLS, alt. 1–5000 ft., *H. f. & T.*

A large woody climber, young branches and flowers tomentose. *Leaves* 3–5 by $1\frac{1}{4}$–2 in., base hardly rounded, petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Flowers* 1–5, fascicled, terminal or leaf-opposed, buds shorter and broader than in other species; bracts ovate or oblong, acute, median. *Sepals* ovate, acute. *Outer petals* $\frac{2}{3}$ in., ovate, acute, slightly keeled inside; inner triangular-oblong, acute, hoary, concave except at the triquetrous tip. *Carpels* 2 in. diam., pubescent; stalk 4–8 in.—Griffith's t. 652 (of Icones iv.), which is not referred to in the "Notulæ," may belong to this species, but the venation differs much.

6. **M. Griffithii,** *H. f. & T. Fl. Ind.* 120; leaves 3–5 in. narrow oblong or lanceolate obtuse or subacute glabrous except the midrib above, rusty-pubescent beneath, tip often retuse, outer petals $\frac{1}{2}$ in. Fissistigma scandens, *Griff. Not.* iv. 706.

TENASSERIM, *Griffith.*

A climbing shrub; bark dark grey, spotted white; young branches and flowers tomentose. *Leaves* 3–5 by $1\frac{1}{4}$–$1\frac{3}{4}$ in., base rounded; petiole $\frac{1}{4}$ in. *Flowers* 2–4 in., sub-terminal in leaf-opposed fascicles terminating a short peduncle; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in.; bracteole median, orbicular, small. *Sepals* orbicular, obtuse. *Outer petals* $\frac{1}{2}$ in.; inner a little shorter, red-brown, glabrous or puberulous.—Resembles *Uvaria sphærocarpa,* Bl., which is a *Melodorum,* but the flower of that plant and the fruit of this are unknown.

7. **M. bicolor,** *H. f. & T. Fl. Ind.* 119; leaves 4–8 in. oblong or lanceolate, lower on each branch obtuse upper acute glabrous except the midrib above silky beneath, outer petals 1 in., carpels globose subglabrous. Uvaria bicolor, *Roxb. Fl. Ind.* ii. 662 (*not of Wall. Cat.*).

From the base of the SIKKIM HIMALAYA and KHASIA HILLS to ASSAM and AVA.

A large woody climber; young branches and flowers tomentose. *Leaves* 4–8 by 2–3 in.; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* 1–3, in leaf-opposed fascicles; pedicels $\frac{1}{2}$–1 in.; bracteole small, basal. *Sepals* ovate. *Outer petals* villous, ovate-lanceolate; inner rather shorter and narrower, glabrous, red. *Carpels* 1 in. diam., mucronate; stalk $\frac{1}{4}$–$\frac{1}{3}$ in.—Very near *M. manubriatum,* but with usually larger, more obtuse leaves, more lateral flowers, and more globose shorter-stalked fruit.

8. **M. Maingayi,** *H. f. & T.;* branchlets pubescent, leaves broad-elliptic or oblong rounded at both ends or tip apiculate glabrous above glaucous and finely pubescent beneath, flowers $1\frac{1}{2}$ in. solitary, calyx orbicular, carpels oblong straight-beaked.

PENANG, *Maingay.*

A scandent shrub; branches black. *Leaves* 3–5 by $1\frac{1}{2}$–2 in., hard, coriaceous, red-brown when dry, opaque above with a slender downy midrib, nerves many, much diverging, slender; petiole $\frac{1}{3}$–$\frac{2}{3}$ in. *Flowers* axillary, cernuous, appressed brown-pubescent; buds with a swollen base $\frac{1}{3}$ in. diam. and trigonous curved beak; pedicel $\frac{1}{4}$–$\frac{1}{2}$ in., stout, curved; bract small, broad, half-amplexicaul. *Calyx* a disk $\frac{1}{3}$ in. diam. *Outer petals* flat but keeled down the middle inside, compressed 3-gonous; base excavated; inner very small, triangular-ovate, glabrous. *Stamens* very many, small, truncate. *Torus* conical, low, top depressed. *Ovaries* about 6, silky; stigma subsessile. *Carpels* $1\frac{1}{2}$–2 by $\frac{3}{4}$ in., rusty puberulous, walls thick; stalk $\frac{1}{2}$ in., stout, straight. *Seeds* $\frac{1}{2}$ in., many, 2-seriate, horizontal; testa shining, not margined.

9. **M. cylindricum,** *Maingay, mss.;* branches rusty-pubescent, leaves oblong elliptic or elliptic-lanceolate acuminate glabrous above brown and

puberulous beneath, flowers ⅓ in. solitary, calyx obtusely triangular, carpels cylindric rough, ends rounded.

Malacca, *Maingay*.

Branches very dark. *Leaves* 3–4½ by 1½–1¾, base rounded, coriaceous, hard, midrib slender, puberulous, nerves many slender diverging; petiole ½–¾ in., pubescent. *Flowers* axillary cernuous; buds short, pyramidal, appressed brown-pubescent; peduncle short, thick, bract obscure. *Calyx* ¼ in. diam. *Outer petals* triangular-ovate, 3-quetrous, base excavated; inner very small indeed, triangular, glabrous. *Torus* as in *M. Maingayi.* Top of *connective* orbicular. *Ovaries*, 4–6 silky-pubescent. *Ripe carpels* 1–1¾ by ⅓–¾ in., curved, brown-pubescent, walls very thin; stalk ½ in., stout. *Seeds*, many ⅓ in. long, 2-seriate, horizontal, testa shining, not margined; aril small, cartilaginous.

** Leaves glabrous or minutely sparsely pubescent beneath. (See also *Maingayi* and *cylindricum*.)

† *Flowers in terminal or leaf-opposed cymes or fascicles.*

10. **M. Wallichii,** *H. f. & T. Fl. Ind.* 118; leaves narrow oblong-lanceolate acute or acuminate sparsely pilose beneath veins distant, outer petals ¾ in., carpels subglobose tomentose.—Uvaria bicolor, *Wall. Cat.* 6466, *not of Roxb.*

Eastern Bengal, in Assam and Silhet, *Wallich*, &c.

A large woody climber, young parts with slight golden pubescence. *Leaves* 4–7 by 1¼–2½ in., base rounded, pale beneath and hairy chiefly on the midrib and distant nerves; petiole ⅓ in. *Flowers* 1–3, in terminal or leaf-opposed fascicles; pedicels ½ in.; bracts 1–2, ovate, basal. *Sepals* small, ovate. *Outer petals* oblong-lanceolate; inner one-third shorter, hoary, brown-purple. *Carpels* (mature?) ½ in. diam., obliquely mucronate; stalk 1 in.

11. **M. polyanthum,** *H. f. & T. Fl. Ind.* 121; leaves narrow oblong or lanceolate usually acute at both ends minutely pubescent beneath, outer petals ¼ in. Uvaria polyantha, *Wall. Cat.* 6467.

Forests of the Khasia hills, Silhet, and Assam.

A large woody climber; branches blackish, glabrous. *Leaves* 3–4 by 1–1½ in., or 8–10 by 2–3½ in., acute or sharply acuminate, pale beneath; petiole ¼–⅓ in., glabrate. *Flowers* small, 3–7, in leaf-opposed cymes; peduncle short, woody, hoary, soon glabrate; pedicels ¼ in., with a basal scale and a median orbicular deciduous bracteole. *Sepals* ovate, subacute, hoary. *Outer petals* ovate, silky outside; inner about half the size, pubescent without, glabrous within.

12. **M. rufinerve,** *H. f. & T. Fl. Ind.* 121; leaves 6–10 in. long obtuse or acute glabrous glaucous beneath, flowers minute.

Eastern Bengal; forests between Silhet and Cachar, *H. f. & T.*

A large woody climber; branches glabrous; buds golden-pubescent. *Leaves* 6–10 by 2½–4 in., base rounded or retuse; petiole glabrous, ½–⅔ in. *Buds* minute, in pubescent leaf-opposed cymes; pedicels ¼ in.; bracteole small, median.—A very distinct species, in an immature condition.

†† *Flowers axillary, solitary, or appearing racemose only through the fall of the floral leaves.*

13. **M. prismaticum,** *H. f. & T. Fl. Ind.* 121; leaves 5–9 in. oblong rounded or abruptly acuminate glabrous brown beneath, sepals connate, outer petals narrow 2 in., carpels oblong obtuse tubercled glabrous.—Uvaria prismatica, *Wall. Cat.* 6455. Pyramidanthe rufa, *Miq. Ann.* ii. 39.

Penang, Malacca and Singapore, *Wallich*, &c.—Distrib. Borneo.

A large woody climber; branches black, glabrous, buds puberulous. *Leaves* 5–9 by $2\frac{1}{2}$–4 in., much smaller at the base of the branches, thickly coriaceous, base rounded, puberulous on the midrib beneath; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Flowers* axillary, solitary; pedicel $\frac{1}{2}$ in.; bracteoles small, linear, subbasal. *Calyx* a slightly 3-lobed cup. *Outer petals* 2 in., tapering from a common base to a long triquetrous point, rusty-pubescent outside, hoary inside; inner $\frac{1}{3}$–$\frac{1}{2}$ in., ovate, acute, glabrate, concave except the triquetrous tip. "*Ovaries* 4–6, strigose, 4- or more-ovuled," Maingay. *Carpels* $\frac{1}{2}$–$1\frac{1}{2}$ in. long; stalk $\frac{1}{2}$–$1\frac{1}{4}$ in.

14. **M. fulgens,** *H. f. & T. Fl. Ind.* 120; leaves 3–4 in. oblong-lanceolate acuminate glabrous except the midrib above pale and appressed pubescent beneath, outer petals $\frac{1}{2}$ in. ovate concave, carpels subglobose silky shining.—Uvaria fulgens *and* Myristica Finlaysoniana, *Wall. Cat.* 6482 and 6793.

MALACCA and SINGAPORE.—DISTRIB. Borneo, Philippines.

A large woody climber (small tree, *Maingay*); branches glabrous, young silky. *Leaves* 2–4 by 1–$1\frac{1}{2}$ in., base rounded or subacute; petiole $\frac{1}{4}$–$\frac{1}{3}$ in., silky. *Flowers* tawny-orange, solitary or in subracemose terminal panicles (through the fall of the floral leaves); pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., golden-tomentose; bracteoles 2–3, linear, upper suborbicular. *Sepals* orbicular, acute. *Outer petals* $\frac{1}{2}$ in., ovate, golden-silky outside, hoary within, with a large concave glabrous basal area; inner oblong, acute, glabrous. *Anthers* purple, appendage long. *Ovaries* strigose. *Ripe carpels* $1\frac{1}{2}$ in. "*Seeds* flattened not scrobiculate." *Maingay.*

SECT. II. **Kentia.** *Flowers* axillary, solitary. *Outer petals* orbicular, with broad much thickened margins. *Ovaries* glabrous, pellucid-glandular; ovules definite or indefinite. *Seeds* pitted.

15. **M. elegans,** *H. f. & T. Fl. Ind.* 122; leaves lanceolate acuminate glabrous above paler and puberulous beneath, carpels oblong or subglobose. Uvaria elegans, *Wall. Cat.* 6474 *A.*

PENANG, *Wallich;* MALACCA, *Maingay.*

A climber; branches slender, glabrous, black; buds brown-pubescent. *Leaves* 3–4 by 1–$1\frac{1}{2}$ in., coriaceous, base rounded or acute; petiole $\frac{1}{2}$ in., glabrous. *Peduncles* slender; bracteoles 2–3, minute, basal. *Sepals* small, ovate, acute, persistent. *Outer petals* $\frac{1}{2}$ in., ovate, subacute, brown silky outside, hoary inside; inner much smaller, ovate, thick, back keeled, fringed round the basal hollow, triquetrous and hoary above the middle. *Ovaries* 8–10-ovuled. *Carpels* $\frac{1}{2}$ in., stalk as long.—Very like *M. Kentii,* H. f. & T., of Java (*Polyalthia,* Blume), but that plant is 2-ovuled.

16. **M. pisocarpum,** *H. f. & T. Fl. Ind.* 123; leaves broad-ovate or -oblong emarginate glabrous above reticulate and puberulous beneath, carpels pisiform granulate glabrate. Uvaria mabiformis, *Griff. Notul.* iv. 709.

MALACCA, *Griffith.*

A shrub, probably climbing; branches glabrous; buds golden-silky. *Leaves* $1\frac{3}{4}$–3 by $1\frac{1}{4}$–$1\frac{3}{4}$ in., coriaceous, base rounded or subacute; petiole $\frac{1}{3}$ in. Peduncles $\frac{1}{4}$–$\frac{1}{2}$ in., slender, hardly downy; bracteoles 2, minute, scale-like, basal; buds subglobose, obtusely triquetrous. *Sepals* small, ovate, acute. *Outer petals* $\frac{1}{4}$ in. broad, ovate, suborbicular, golden-silky outside, hoary inside; inner about half as long, narrow-oblong. *Ovaries* 2-ovuled. *Carpels* $\frac{1}{4}$ in. diam., globose; stalk the same length. "*Seeds* 2, scrobiculate, arilled." *Maingay.*

18. **XYLOPIA,** Linn.

Trees or shrubs. *Leaves* coriaceous. *Flowers* axillary, solitary cymose or fascicled; buds triquetrous, conic, often slender. *Sepals* 3, valvate, connate. *Petals* 6, elongate, valvate in 2 series; outer flat or concave; inner nearly as long, 3-gonous, concave at the base only. *Torus* flat, or hollow and enclosing the carpels. *Stamens* oblong, truncate or connective produced; anther-cells remote or contiguous, usually septate, with a large pollen-grain in each cellule. *Ovaries* 1 or more; style long, clavate; ovules 2–6 or more, 1–2-seriate. *Ripe carpels* long or short, continuous or moniliform, usually several-seeded.—DISTRIB. Tropics generally; species 30–40.—Closely allied to *Melodorum*, but very different in habit.

SECT. I. **Habzelia,** *Alph. DC.* (*Gen.*). *Torus* flat or slightly concave. *Ripe carpels* cylindric or obovoid.

1. **X. ferruginea,** *H. f. & T. Fl. Ind.* 123 (Habzelia); leaves narrow-oblong acute glabrous and shining above glaucous beneath and rusty-pubescent on the veins, peduncles solitary or geminate, carpels cylindric slender subtorulose. Artabotrys malayana, *Griff. Notul.* iv. 713.

MALACCA, *Griffith*, *Maingay*.

A flexuous ramose shrub; branchlets rusty-pubescent. *Leaves* 5–7 by 1½–2 in., base oblique rounded or subcordate, much reticulate; petiole ¼–⅙ in. *Flowers* pendulous, yellow, fragrant; peduncles ¾–1¼ in., rusty-pubescent. *Sepals* ovate, acute. *Outer petals* ¼ in., taper-pointed, yellow-tomentose; inner shorter, narrower, triquetrous above, base contracted. *Anthers* with a long narrow process, cells septate. *Ovaries* many golden strigose. *Carpels* ½–4 in., blood-red. *Seeds* ovoid, aril 0.

2. **X. oxyantha,** *H. f. & T. Fl. Ind.* 124 (Habzelia); leaves ovate or oblong abruptly acuminate glabrous glaucous below, peduncles fascicled axillary. Uvaria oxyantha, *Wall. Cat.* 6478.

SINGAPORE, *Wallich*.

A tree; branches glabrous; young parts puberulous. *Leaves* 7–8 by 2½–3½ in.; petiole ⅕ in. *Flowers* more than 1 in. long, peduncles ⅓–½ in., appressed downy. *Sepals* broad-ovate. *Outer petals* 1¼–1½ in., narrow-linear, pubescence yellowish appressed, back slightly keeled.

3. **X. malayana,** *H. f. & T. Fl. Ind.* 125; leaves oblong obtusely acuminate glabrous reticulate beneath, peduncles very short 3–5-flowered, sepals united to the middle, carpels cylindric-oblong obtuse pubescent. Parartabotrys sumatrana, *Miq. Fl. Ned. Ind. Suppl.* i. 374.

MALACCA, *Griffith*.—DISTRIB. Sumatra.

A tree; branches slender, glabrous; buds pubescent. *Leaves* 3–5 by 1½–2 in., coriaceous, base acute, pale-brown when dry beneath; petiole ⅙–¼ in. *Flowers* ½–1 in. long, triquetrous; peduncles axillary, 1-bracteate; pedicels short and brown-tomentose. *Sepals* ovate, acute. *Outer petals* linear; inner shorter. *Connective* prolonged; anther-cells septate. *Ovaries* 5–7, strigose, 2-ovuled (6-ovuled, *Maingay*). *Carpels* ⅓–1 in., many-seeded; stalk short, thick.

4. **X. obtusifolia,** *H. f. & T.*; leaves oblong obtuse or retuse glabrous and shining above brown-silky beneath, cymes subracemose, sepals acute united to the middle.

MALACCA, *Griffith*.

A tree; branches glabrous; buds rather silky. *Leaves* 2–3 by 1–1½ in., coriaceous, base acute; petiole ⅙–¼ in. *Flowers* like those of *X. malayana* in shape and size, brown-silky. *Cymes* ⅓–½ in.; pedicels ¼ in., rather silky, with a median and basal bracteole. *Ovules* 4–5.

5. **X. fusca,** *Maingay mss.*; branches glabrous, leaves small elliptic- or linear-oblong obtuse coriaceous glabrous, nerves faint reticulate, flowers

solitary racemed or fascicled, pedicel and subentire calyx rarely pubescent, petals brown-silky, ovaries 4–5.

MALACCA, *Maingay.*

A tree; branches rather stout black, tips and very young leaves silky, shining. *Leaves* 2–3 by ¾–1 in., base acute, opaque above, rather darker beneath, midrib sometimes puberulous; petiole ¼ in., stout. *Flowers* ¾ in., pendent; peduncle ¼–1 in., stout, curved; bracts few, minute; pedicels short, stout, ebracteolate. *Petals* shining; outer linear from a rather broader base, concave; inner rather shorter, narrower, 3-gonous, base excavated. Top of *connective* oblong; anther-cells not septate, lateral. *Ovaries* cohering in a cone on the slightly concave torus, golden-silky; style short, subulate; ovules 10–12, 2-seriate.

6. **X. magna,** *Maingay mss.;* leaves oblong or ovate-oblong obtuse or acute glabrous above softly pubescent beneath coriaceous, flowers solitary or racemes terminal, sepals united beyond the middle, carpels obliquely ovoid or obovoid compressed puberulous.

MALACCA, *Maingay.*

A tree; branches black, glabrous, branchlets pubescent. *Leaves* 3–6 by 1¼–2½ in., base obtuse or rounded, thick, above dull, beneath very opaque, brown, nerves faint; petiole $\frac{1}{12}$–⅛ in. *Flowers* 5 in. long, white, slender; peduncles very short. *Sepals* united into a broad acutely-lobed cup, ferruginous. *Petals* hoary, subequal; outer very narrow, subulate, flat; inner more slender, base concave. *Torus* concave. *Anthers* rose-coloured, slender, cells septate, tip orbicular. *Ovaries* strigose; style slender, stigma hairy; ovules 4. *Carpels* 1½ in., walls thick; stalk very short; torus ¾ in. diam. *Seeds* about 4, superposed, arillate, testa osseous.

SECT. II. **Euxylopia.** *Torus* much hollowed, bearing the stamens outside and enclosing the ovaries.

7. **X. parvifolia,** *H. f. & T. Fl. Ind.* 125; leaves oblong-lanceolate acuminate glabrous shining above pale beneath, pedicels fascicled clothed with bracteoles, sepals united to the middle, carpels obovoid or oblong subsessile pubescent. *Thwaites Enum.* 9; *Beddome Ic. Pl. Ind. Or.* t. 43. Patonia parvifolia, *Wight Ill.* 19.

Southern parts of CEYLON.

A tree; young branches brown-pubescent. *Leaves* 2–3 by ¾–1¼ in., coriaceous, base acute; petiole ⅓ in. *Flowers* ½ in. long, in axillary 3–5-flowered subsessile fascicles, pubescence brown appressed; pedicels very short; bracteoles orbicular, the upper close to the calyx. *Sepals* acute. *Ovaries* 5, 4–6-ovuled. *Carpels* 1–1½ in. *Seeds* oblong, smooth; imbedded in pulp (arillate?).—(*Patonia Walkeri,* Wight Ill. l.c., is a species of *Diospyros.*)

8. **X. nigricans,** *H. f. & T. Fl. Ind.* 125; leaves broad lanceolate obtusely acuminate glabrous shining above pale beneath, peduncles 2–3 together axillary, bracteoles 2–3 deciduous, sepals free, carpels as in X. parvifolia. *Thwaites Enum.* 9, 398; *Beddome Ic. Pl. Ind. Or.* t. 44.

CEYLON; at Trincomalee, *Glenie;* and in the Doombera district, *Thwaites.*

A tree; branches glabrous; young puberulous. *Leaves* 2–3 by 1–1½ in., thin, coriaceous, base acute; petiole ⅙ in. *Flowers* ½ in. long, pubescence ochreous, appressed; pedicels ⅙–¼ in., short, slender, downy. *Ovaries* 5, about 4-ovuled.

9. **X. Championii,** *H. f. & T. Fl. Ind.* 126; leaves lanceolate or oblong-lanceolate acuminate pellucid-dotted glabrous and shining above puberulous beneath, peduncles solitary, sepals united almost to the tips, carpels oblong 5-ribbed short-stalked. *Thwaites Enum.* 9; *Beddome Ic. Pl. Ind. Or.* t. 45.

CEYLON; Ambagamowa and Ratnapoora districts, *Gardner*, &c.

A tree; branches slender, glabrous; buds rather silky. *Leaves* 3–5 by 1–$1\frac{3}{4}$ in., thin, coriaceous, base acute, pale beneath; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* 1 in. long, pale ochreous or reddish, tomentose, triquetrous, broader than in its congeners; pedicels $\frac{1}{6}$ in., brown-silky; bracteoles 2–3, minute, basal. *Calyx* slightly 3-lobed. *Petals* triquetrous above; inner narrower, one-third shorter. *Ovary* solitary, 4-ovuled, *Carpels* $1\frac{3}{4}$ in. *Seeds* enveloped in pulp.

10. **X. caudata,** *H. f. & T. Fl. Ind.* 125; leaves oblong or lanceolate long obtusely acuminate tip mucronate glabrous except the midrib above silky beneath, peduncles 1–3 very short axillary bracteolate at the base and under the calyx, sepals connate at the base, carpels subglobose or ovoid pubescent short stalked. Guatteria? caudata, *Wall. Cat.* 6452.

SINGAPORE, *Wallich;* MALACCA, *Griffith.*

A small leaved, much branched shrub, or small tree; branchlets hoary. *Leaves* $1\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{2}{3}$–1 in., thin, coriaceous, pellucid-punctate, grey beneath; petiole $\frac{1}{12}$ in. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in. long, subsessile. *Sepals* hoary. *Petals* silky, about equal in length, very slender. *Ovaries* 2, silky hairy, 2-ovuled; styles long, clavate, glabrous, exserted. *Carpels* 2–3, $\frac{1}{2}$ in., 2-seeded.

11. **X. pustulata,** *H. f. & T.;* branches pustulate, leaves small elliptic glabrous tip narrowed obtuse dark beneath, nerves faint, peduncles solitary or geminate very short, sepals united to the middle.

MALACCA, *Maingay.*

A tree?; branches pale, minutely white-dotted, glabrous. *Leaves* 1–2 by $\frac{2}{3}$–1 in., base acute, coriaceous, thick, hardly shining above with obscure veins, reddish brown and reticulated beneath, nerves and venules all alike; petiole $\frac{1}{8}$ in. *Flowers* $\frac{1}{2}$ in. long, many, axillary, pendent; bracts basal, orbicular, ciliate, deciduous; buds obtuse. *Sepals* short, ovate, subacute, rusty-pubescent. *Petals* densely appressed pubescent; outer linear from a rather broader concave base, obtuse; inner much narrower, rather shorter, trigonous with a broader excavated base. *Stamens* outside the torus, linear; anther-cells long, septate, top of connective rounded. *Ovaries* 5–8, sunk in the concave top of the torus, strigose; style slender, clavate; ovules several.

12. **X. Maingayi,** *H. f. & T.;* branches rusty-pubescent, leaves small elliptic or elliptic-oblong glabrous subacute or obtusely acuminate, nerves very finely reticulate, flowers solitary, peduncles very short and calyx rusty-tomentose, buds hooked, ovaries many.

MALACCA, *Maingay.*

A tree; branches minutely white-dotted. *Leaves* 2–3 by 1–$1\frac{1}{4}$ in., base subacute, coriaceous, pale above, darker beneath, nerves very slender reticulate on both surfaces; petiole slender, $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* 1–$1\frac{1}{2}$ in. long, pendent, pale orange; peduncle very short, stout, curved, and calyx rusty-tomentose; bracteoles 2–3, orbicular, persistent. *Sepals* connate to the middle. *Outer petals* flat, very narrow, subacute, base concave, silky tomentose; inner as long, very narrow, 3-gonous, base excavated. *Anther-cells* septate, tip of connective rose-coloured, rounded. *Ovaries* about 9, immersed in the torus, style glabrate; ovules 6.

13. **X. dicarpa,** *H. f. & T.;* branches glabrous, leaves elliptic-lanceolate obtuse or obtusely acuminate glabrous, nerves very finely reticulate, flowers solitary or geminate, pedicels short and calyx glabrous, sepals connate to the middle, ovaries 2.

SINGAPORE, *Maingay.*

A tree?; *branches* dark, minutely dotted. *Leaves* 3–$4\frac{1}{2}$ by $1\frac{1}{2}$–$1\frac{3}{4}$ in., base acute, firm, coriaceous; nerves oblique, finely recticulate on both surfaces; petiole $\frac{1}{4}$ in. *Flowers* $1\frac{1}{2}$ in., pendent, peduncle very stout; bracteoles 1–3, orbicular, amplexicaul. *Sepals* obtuse, tubercled. *Petals* hoary, outer narrow from a rather broader base, concave; inner narrower, 3-gonous. *Stamens* many, inner imperfect; anther-cells septate; tip of connective rounded. *Ovaries* sunk in the torus, pilose; style short; ovules many.

14. **X. elliptica,** *Maingay mss.*; branches glabrous, leaves small elliptic obtuse membranous glabrous, tip rounded, nerves faint reticulate, flowers small solitary erect pubescent, sepals subacute united to the middle, ovaries 1–3.

Malacca, *Maingay.*

A lofty tree; trunk thick; branches glabrous, almost black; branchlets pubescent. *Leaves* 1$\frac{1}{2}$–2 by 1$\frac{1}{4}$–1$\frac{1}{2}$ in., base obtuse or acute, pale on both surfaces, browner beneath; petiole $\frac{1}{4}$ in., puberulous. *Flowers* $\frac{1}{2}$–$\frac{3}{4}$ in., slender; peduncle half as long or shorter, and calyx rusty-pubescent; bracts median, minute. *Petals* pale brown-tomentose; outer linear subulate, from a rather broad base, concave; inner trigonous, base excavated. *Stamens* minute. *Ovaries* sunk in the deeply urceolate torus, hidden amongst long white hairs; ovules 4–6.

19. **MILIUSA,** Leschenault.

Trees or shrubs. *Flowers* 1–2-sexual, green or red, axillary or extra-axillary, solitary fascicled or cymose. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 series; outer smaller, like the sepals; inner cohering when young by the margins, at length free. *Torus* elongated, cylindric. *Stamens* definite or indefinite; anthers subdidymous; cells contiguous, ovoid, extrorse; connective hardly apiculate. *Ovaries* indefinite, linear-oblong; style oblong or very short; ovules 1–2, rarely 3–4. *Ripe carpels* globose or oblong, 1–many-seeded.—Distrib. Species 7; all Indian.

1. **M. macrocarpa,** *H. f. & T. Fl. Ind.* 150; leaves lanceolate or narrow-oblong long-acuminate glabrous shining above, flowers bisexual? solitary or in leafy cymes, sepals and outer petals large ovate $\frac{1}{3}$ in., carpels glabrous long-stalked.

Sikkim-Himalaya; Khasia hills, *Simons.*

A small tree; branches glabrous. *Leaves* 4–9 by 1$\frac{1}{2}$–2$\frac{1}{2}$ in., thin, coriaceous, pale beneath; petiole $\frac{1}{12}$–$\frac{1}{6}$ in. *Flowers* subterminal or leaf-opposed; peduncle 2–3 in., clavate upwards. *Outer petals* ovate, glabrous, granulate outside, edges and inside appressed-pubescent; inner $\frac{2}{3}$ in., lengthening much after expansion, glabrous, ciliate. *Ovaries* oblong, silky; style oblong, glabrous; ovules 1–2. *Carpels* 1 in., dark-purple, fleshy; stalk as long, 1-seeded, or 2-seeded and twice as broad.—Differs from its congeners in the large sepals and outer petals; inner petals very small in bud.

2. **M. indica,** *Lesch. in A. DC. Mem. Soc. Genev.* v. 36; leaves ovate or ovate-cordate obtuse or lanceolate and acute or acuminate glabrous or pubescent beneath, flowers 2-sexual axillary solitary, inner petals oblong subacute, carpels pisiform subsessile. *W. & A. Prodr.* 10; *Wall. Cat.* 6433; *H. f. & T. Fl. Ind.* 148; *Beddome Ic. Pl. Ind. Or. f.* 85. M. montana, *Gardner ex Fl. Ind. l.c.*; *Thwaites Enum.* 4. Beddome l.c. t. 84.

Malabar, Maisor, and Ceylon, in the Central Province, *Gardner.*

A much branched very variable shrub; branches strigose, tomentose or glabrate. *Leaves* 1–2$\frac{1}{2}$ by $\frac{3}{4}$–1$\frac{1}{4}$ in., base generally oblique, coriaceous; petiole obsolete. *Flowers* greenish, purple near the base; pedicel $\frac{1}{4}$–$\frac{3}{4}$ in, slender; bracteoles several, basal. *Outer petals* equalling or 2–3 times exceeding the oblong subacute inner. *Ovaries* 1–2-ovuled.

Var. 1. *tomentosa;* branchlets and leaves beneath tomentose, carpels pubescent.
Var. 2. *strigose;* branchlets and leaves beneath strigose, carpels glabrous.
Var. 3. *montana;* branchlets and much smaller leaves glabrous.

3. **M. zeylanica,** *Gard. ex H. f. & T. Fl. Ind.* 149; leaves oblong-lanceolate obtuse acute or acuminate young puberulous beneath, flowers 2-sexual axillary solitary, inner petals narrow oblong taper-pointed, carpels pisiform subsessile. *Thwaites Enum.* 61; *Beddome Ic. Pl. Ind. Or.* t. 89.

Ceylon; southern parts of the Island, *Walker*, &c.

A small tree; branches rugose, young strigose or downy. *Leaves* 2–4 by 1–1½ in., coriaceous, rigid, base somewhat oblique rounded or retuse, midrib downy above, when old glabrous on both surfaces; petiole 1/12–⅙ in., strigose. *Flowers* ¾–1 in. long; peduncle short, downy; bracteoles several, basal. *Sepals* and *outer petals* oblong, hardly acute, softly ciliate; inner petals narrow-oblong, greenish-yellow, base purple.—Closely allied to *M. indica;* but leaves longer and petals narrower.

4. **M. Wightiana,** *H. f. & T. Fl. Ind.* 149; leaves narrow-oblong or oblong-lanceolate obtusely acuminate glabrous shining above, flowers polygamous axillary, inner petals oblong subacute, carpels pisiform or oblong glabrous granulate. *Beddome Ic. Pl. Ind. Or.* t. 86.

Hill forests of Tinivelly and Travancor, *Wight*, &c.

A small tree, bark rough; branches glabrous. *Leaves* 2–4 by ⅔–1 in., thin, coriaceous, pale beneath; petiole 1/12 in. *Flowers* like those of *M. indica;* peduncles 1–2 in., slender; bracteoles 1–2, minute, basal. *Ovaries* 1–2-ovuled. *Carpels* 1–2-seeded; stalks as long or longer.

5. **M. Roxburghiana,** *H. f. & T. Fl. Ind.* 150; leaves oblong or oblong-lanceolate abruptly acuminate shining above glabrous or tomentose beneath, flowers 1–3 together diœcious axillary, inner petals ovate obtuse, carpels ovoid or pisiform and glabrous. M. Wallichiana, *H. f. & T. l.c.* 149. Uvaria dioica, *Roxb. Fl. Ind.* ii. 659. Guatteria globosa, *A. DC. Mem. Soc. Genev.* v. 43; *Wall. Cat.* 6448. Hyalostemma Roxburghiana, *Wall. Cat.* 6434; *Griff. Ic. Pl. Ind. Or.* iv. t. 653.

Sikkim, Assam, and the Khasia hills to Tenasserim.

A small tree; branches softly pubescent; leaves beneath pedicels and calyx glabrous or densely pubescent. *Leaves* 3–6 by 1–2 in., thin, coriaceous, lower on the branch smaller, subobtuse; petiole obsolete. *Pedicels* ½–1½ in., sometimes on a short peduncle, slender; bracts several, linear. *Sepals* lanceolate. *Inner petals* 1 in., ovate, obtuse, blood-red, veins dark. *Carpels* 1- rarely 2-seeded; stalk ¾ in.

6. **M. velutina,** *H. f. & T. Fl. Ind.* 151; leaves ovate or oblong acute or acuminate tomentose on both surfaces, flowers 2-sexual subracemose, inner petals ovate, carpels ovoid downy short-stalked. *Beddome Ic. Pl. Ind. Or.* t. 87. Uvaria velutina, *Dunal Anon.* 91. U. villosa, *Roxb. Fl. Ind.* ii. 664. Guatteria velutina, *A. DC. Mem. Soc. Genev.* v. 42; *Wall. Cat.* 6441.

Garwhal, Behar, Malwah, Orissa, Malabar, and Pegu.

A large tree; young branches densely tomentose. *Leaves* 3–6 by 2–4 in., lower on the branches smaller and often obtuse, base obliquely cordate; petiole ⅒ in. *Flowers* 3–6, in leaf-opposed cymes or in short few-leaved branches; pedicels 2–4 in., slender, tomentose; bracts minute, basal deciduous. *Sepals* and *outer petals* small, ovate; inner petals ⅓ in., ovate, dark brown, glabrous inside. *Carpels* size of a cherry.

7. **M. nilagirica,** *Beddome Ic. Pl. Ind. Or.* t. 88; leaves lanceolate linear-lanceolate or elliptic taper-pointed glabrous, peduncles axillary glabrous, inner petals broadly ovate-lanceolate, stamens 8 1-seriate, carpels pisiform glabrous.

Northern slopes of the Nilgiris, alt. 5000 ft., *Beddome.*

A large shrub; branches glabrous. *Leaves* 2–4 by ¾–1¾ in., narrowed and obtusely pointed at both ends, coriaceous; petiole ¼–⅓ in. *Flowers* ⅓ in. long; peduncles

⅓–1 in.; bracteoles 2–3, basal. *Sepals* and outer petals subequal, ciliate; inner petals glabrous except the thickened margin near the tip. *Ovaries* about 13, glabrous; style oblong or globose; ovules 1–2. *Carpels* pisiform; stalks ⅙–¼ in.

20. **SACCOPETALUM,** Bennett.

Trees. *Leaves* deciduous. *Flowers* axillary, solitary or fascicled. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 series; outer small, like the sepals; inner much larger, erect or conniving, base saccate. *Stamens* indefinite; anther-cells dorsal, contiguous; connective produced into a conspicuous appendage. *Ovaries* indefinite; ovules 6 or more. *Ripe carpels* subglobose.—DISTRIB. Species 5, Eastern Asiatic, with one Australian.—Reduced to *Miliusa* by Baillon (Hist. des Plantes, 244).

1. **S. longiflorum,** *H. f. & T. Fl. Ind.* 151; leaves ovate-oblong or oblong-lanceolate acuminate glabrous above appressed pubescent beneath, peduncles very short solitary in the old axils, inner petals oblong-lanceolate, carpels glabrous.

EASTERN BENGAL, near Purneah, *Hamilton.*

A tree; branchlets puberulous. *Leaves* 8 by 3 in., thin, coriaceous, appressed-pubescent beneath; petiole ⅓ in. *Peduncles* ¼ in.; downy. *Sepals* and outer petals ⅙ in., oblong; inner petals 1⅓ in., tapering to an obtuse point, thin, downy, base subsaccate. *Carpels* 1–1¼ in. diam., berried, black; stalk ¾ in.

2. **S. tomentosum,** *H. f. & T. Fl. Ind.* 152; leaves ovate or ovate-oblong acute glabrous above except the midrib pubescent or tomentose beneath, flowers cymose, peduncles long, inner petals oblong obtuse. *Beddome Ic. Pl. Ind. Or.* t. 49. Uvaria tomentosa, *Roxb. Cor. Pl.* i. t. 35; *Fl. Ind.* ii. 667; *Wall. Cat.* 6472; *W. & A. Prodr.* 8.

Terai of NEPAL at Gorakpore, ORISSA, and BEHAR, from the CONCAN to TRAVANCOR.

A large tree; branchlets tomentose. *Leaves* 4–6 by 2½–3 in., sometimes glabrous when old, base obliquely cordate, pale beneath; petiole ¼ in. *Flowers* few, in leaf-opposed or subterminal cymes, appearing with the leaves in short leafy branches; peduncles 2–3 in., slender, downy. *Sepals* and *outer petals* ⅙ in.; inner petals ⅔ in., oblong, obtuse, downy. *Carpels* 1 in. diam., purple, 3–4 seeded; stalk ½ in.—Intermediate between *Miliusa* and *Saccopetalum.*

3? **S. sclerocarpum,** *H. f. & T.*; leaves ovate or oblong obtuse or obtusely acuminate glabrous.—Uvaria sclerocarpa, *A. DC. in Mem. Genev.* v. 27; *Wall. Cat.* 6461; *H. f. & T. Fl. Ind.* 103.

MARTABAN, *Wallich.*

A tree, branches glabrous. *Leaves* 4–5 by 2–2½ in., thin, coriaceous, base a little *ciliate.* *Unripe carpels* ½–⅔ in, ovoid, subacute, glabrous; stalks rather longer.—A very imperfectly known plant; certainly not a *Uvaria.*

21. **ALPHONSEA,** H. f. & T.

Lofty trees. *Leaves* thick, coriaceous, glabrous, shining. *Flowers* small or middle-sized, in leaf-opposed rarely extra-axillary peduncled fascicles. *Sepals* 3, small, valvate. *Petals* 6, valvate in 2 series, larger than the sepals, equal or the inner rather smaller. *Torus* cylindric or hemispheric. *Stamens* indefinite, loosely packed; anther-cells dorsal, contiguous; connective apiculate. *Ovaries* 1 or more; style oblong or depressed; ovules 4–8, in 2 series on the ventral suture. *Carpels* subsessile or stalked. — DISTRIB. Species 3, all Indian.—Baillon Hist. 215, unites this genus with *Bocagea.*

1. **A. ventricosa,** *H. f. & T. Fl. Ind.* 152; leaves narrow-oblong long-acuminate glabrous shining above, flowers in fascicled short racemes, pedicels ½–1 in. bracteolate at the base and middle, carpels tomentose long-stalked.—Uvaria ventricosa, *Roxb. Fl. Ind.* ii. 658; *Wall. Cat.* 6453.

ASSAM, CHITTAGONG, ANDAMANS, PENANG.

A lofty tree; branches glabrous, young brown-tomentose. *Leaves* 6–10 by 1½–4 in., base rounded or subacute, young pubescent on the midrib, pale and conspicuously veined beneath; petiole ¼ in., puberulous. *Flowers* numerous, greenish-white, odorous; racemes tomentose; pedicels ½–1 in., with an ovate median and basal bracteole. *Sepals* small, broad ovate, connate below. *Petals* ¾ in., ovate-oblong, brown-tomentose outside. *Ovaries* about 10, villous; style oblong. *Carpels* 1–1½ in. diam.; ovoid or subglobose; stalk nearly as long.

2. **A. lutea,** *H. f. & T. Fl. Ind.* 153; leaves ovate-oblong glabrous obtusely acuminate, flowers subcapitate, carpels tomentose subsessile. *Thwaites Enum.* 399; *Beddome Ic. Pl. Ind. Or.* t. 91. Uvaria lutea, *Roxb. Cor. Pl.* i. t. 36; *Fl. Ind.* ii. 666 (*not of Wall. nor W. & A.*). Uvaria Russellii, *Wall. Cat.* 6464.

From SILHET to PEGU, *Beddome;* mountains of ORISSA; CEYLON, Reigam Corle, *Thwaites.*

A tree; young branches brown-pubescent. *Leaves* 3–5 by 1½–2½ in., base rounded, pale and conspicuously nerved beneath with puberulous costa and nerves; petiole ⅙–¼ in., and midrib at first pubescent. *Flowers* in dense leaf-opposed fascicles; peduncle and very short pedicels densely brown-tomentose. *Sepals* orbicular. *Petals* ½ in., ovate, densely tomentose. *Ovaries* about 10, densely villous; style oblong. *Carpels* 1–1½ in., broad ovoid, obtuse at both ends; stalk very short.

3. **A. zeylanica,** *H. f. & T. Fl. Ind.* 153 (incorrect as to fruit); leaves lanceolate acute or long acuminate glabrous shining above, flowers few in leaf-opposed or extra-axillary fascicles, carpels smooth, tomentose stalked. *Beddome Ic. Pl. Ind. Or.* t. 90. Uvaria lutea var. *a*, *W. & A. Prodr.* 8 (*excl. syn.*). Guatteria acutifolia, *Wall. Cat.* 6438 *D.*

TRAVANCOR, at Courtalam, *Wight;* CEYLON, Central Province, alt. 3–4000 ft., *Walker*, &c.

A tree; young branches downy. *Leaves* 2½–4 by ⅔–1 in., tip rather obtuse, midrib puberulous beneath when young; petiole ⅙–¼ in., slender. *Flowers* yellow-green; peduncle very short, tomentose; pedicels ¼–½ in., pubescent; bracteole small, basal. *Petals* ½–⅔ in., downy outside, glabrous within. *Ovaries* 5; style depressed. *Carpels* 1–1½ in diam., subglobose; stalk 1–1½ in., stout.

4. **A. sclerocarpa,** *Thwaites Enum.* 11; leaves lanceolate obtuse glabrous, flowers fascicled on a very short extra-axillary peduncle, pedicels short, carpels bony warted subsessile tomentose.

CEYLON, at Haragam, &c., *Thwaites.*

A tree; branches glabrous; buds brown-tomentose. *Leaves* 2–3½ by ¾–1½ in., base acute, pale beneath; petiole ⅙–¼ in. *Flowers* numerous, ochreous-yellow; pedicels ¼ in., brown-pilose, with a basal and median bracteole. *Sepals* very small. Petals ¼ in., hairy outside. *Stamens* 15, 2–3-seriate. *Ovaries* 3–5; style depressed. *Carpels* 1–2 in., yellow, ovoid or subglobose; stalk short.

5. **A. madraspatana,** *Beddome Ic. Pl. Ind. Or.* t. 92; leaves lanceolate elliptic-ovate or oblong obtuse, flowers fascicled on leaf-opposed or supra-axillary peduncles, carpels ovoid.

By streams in Maisor and the Carnatic, *Beddome.*

An umbrageous tree. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., much reticulated beneath; petioles $\frac{1}{4}$ in., glabrous or puberulous. *Flowers* 1–6, bright yellow; peduncles very short; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., puberulous; bracteole infra-median. *Sepals* small, ovate. *Petals* $\frac{3}{8}$ in., puberulous outside. *Stamens* 12, 2-seriate. *Ovaries* 3–4; style subglobose, slightly curved; ovules about 8; 2-seriate. *Carpels* yellow-tomentose.

6. **A. Maingayi,** *H. f. & T.;* leaves elliptic-oblong or -lanceolate obtusely or subacutely acuminate shining above reticulate and pubescent beneath, flowers solitary or in loose supra-axillary racemes, ripe carpels very short-stalked tomentose.

Malacca, *Maingay.*

A middle sized or lofty tree; branches black, young rusty-tomentose. *Leaves* 3–7 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., base acute or rounded, hard, coriaceous, pale yellow-brown, rusty beneath, petiole $\frac{1}{6}$–$\frac{1}{4}$ in., rusty. *Flowers* $\frac{3}{4}$ in. diam.; peduncles $\frac{1}{12}$–$1\frac{1}{2}$ in. and very short pedicels rusty-tomentose; bracts small. *Sepals* $\frac{1}{10}$ in. *Outer petals* ovate, recurved, pubescent outside; inner similar but rather smaller. *Torus* 6-angled. *Filaments* broad short fleshy; anther-cells small, diverging below. *Stigma* sessile; ovules about 20. *Carpels* 2 by 1 in., obtuse, smooth. *Seeds* many, smooth.

7. **A. elliptica,** *H. f. & T;* leaves elliptic or elliptic-ovate acuminate shining above glabrous reticulate, nerves very slender, flowers solitary or in 2–3-flowered racemes, peduncle short multibracteate.

Malacca, *Maingay.*

A tree?; branches rugose, quite glabrous. *Leaves* 3–5 by $1\frac{1}{4}$–$1\frac{3}{4}$ in., tip acute or obtuse, base acute, thin, coriaceous, nearly concolorous, nerves about 5 on a side, venules reticulate on both surfaces; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Flowers* $\frac{2}{3}$ in. diam.; peduncles very short, bracts many short orbicular persistent; pedicels $\frac{1}{4}$–$\frac{1}{3}$ in., slender, curved, bracteoles minute, median. *Petals* appressed-pubescent; outer broad-ovate, revolute; inner rather smaller. *Stamens* imbricate in several series, apiculate; anther-cells oblong. *Ovaries* linear-oblong, silky; stigma subsessile; ovules many, 2-seriate.

22. **OROPHEA,** Blume.

Trees or shrubs. *Flowers* usually small, axillary solitary, fascicled or cymose. *Sepals* 3, valvate. *Petals* 6, valvate in 2 series; outer ovate; inner clawed, cohering by their margins into a mitriform cap. *Stamens* definite, 6–12, ovoid, fleshy; anther-cells dorsal, large, contiguous. *Ovaries* 3–15; style short or 0; ovules 4. *Ripe carpels* 1- or more-seeded (very long in *O. enterocarpa*).—Distrib. Species about 16; all Eastern Asiatic.—Intermediate between *Mitrephora* and *Bocagea*, having the perianth of the former and stamens of the latter.

1. **O. uniflora,** *H. f. & T. Fl. Ind.* 111; leaves elliptic-oblong or lanceolate obtusely acuminate glabrous, peduncles solitary axillary, stamens 12 2-seriate, carpels globose glabrous short-stalked. *Beddome Ic. Pl. Ind. Or.* t. 69.

Forests of Travancor at Courtalam, *Wight.*

A shrub or small tree; branches glabrous; buds pubescent. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{3}{4}$–1 in., thin, coriaceous, base acute, pale beneath; petiole $\frac{1}{12}$ in. *Flowers* solitary; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., slender; bracteoles several, minute, basal, and 1 median. *Sepals* minute, orbicular, ciliate. *Outer petals* $\frac{1}{6}$ in., ovate or orbicular, membranous, glabrate; inner $\frac{1}{2}$ in., trapezoid, tapering into the narrow claw. *Ovaries* 6; ovules 2. *Carpels* $\frac{1}{2}$ in. diam., brown-black.

2. **O. zeylanica,** *H. f. & T. Fl. Ind.* 111; leaves ovate or oblong shortly and obtusely acuminate glabrous, peduncles solitary or fascicled

axillary, stamens 6, carpels globose glabrous short-stalked. *Thwaites Enum.* 8; *Beddome Ic. Pl. Ind. Or.* t. 70.

Forests of CANARA and COORG, *Stocks*, &c.; and CEYLON in the Central Province, *Thwaites.*

A small tree or shrub; branchlets yellow-pubescent. *Leaves* 2–3½ by 1–1¾ in., thin, coriaceous, base suboblique rounded or retuse, young puberulous beneath; petiole $\frac{1}{24}$–$\frac{1}{12}$ in. *Flowers* greenish-brown, ½ in. diam.; peduncles 1–2 in., 1–4-flowered, slender, pubescent; peduncle with a basal bract. *Sepals* and outer petals orbicular, acute, veined, downy; inner petals larger, trapezoid, glabrous, margins pubescent. *Carpels* ⅓ in. diam.

3. **O. Thomsoni,** *Beddome in Trans. Linn. Soc.* xxv.; *Ic. Plant Ind. Or.* t. 67; leaves ovate-oblong obtusely taper-pointed glabrous, peduncle axillary 3-flowered strigose, stamens 10–12 2-seriate, carpels pisiform.

Anamally forests, TRAVANCOR, alt. 1500–2000 ft. *Beddome.*

A small tree. *Leaves* 1–1½ –2 by 1–1¼ in., midrib beneath pubescent; petiole $\frac{1}{12}$–⅙ in. *Peduncle* and pedicels very short; bracteoles minute basal. *Sepals* and outer petals strigose; inner pubescent, especially inside. *Ovaries* 5–6, hairy; ovules 2.

4. **O. erythrocarpa,** *Beddome in Trans. Linn. Soc.* xx. 5; *Ic. Pl. Ind. Or.* t. 68; leaves oblong abruptly acuminate glabrous above pubescent beneath, peduncles axillary or supra-axillary 3–4-flowered tomentose, stamens 12, 6 outer rather imperfect, carpels oblong.

Anamally forests in TRAVANCOR, alt. 1500–2500 ft., *Beddome.*

A middle sized tree; branchlets softly pubescent. *Leaves* 2–3½ by 1–2 in., thin, coriaceous, most pubescent on the midrib beneath; petiole $\frac{1}{12}$–⅙ in., pubescent. *Flowers* very small; peduncle 1 in., tomentose; bracts many, minute, imbricate below the fruit or flower; pedicels with a linear basal and a supra-median bracteole. *Sepals* orbicular. *Outer petals* ovate, acute, margins and outer surface pubescent; inner ¼ in., claw glabrous, limb trapezoid hairy. *Ovaries* 6, densely strigose; ovules 2. *Carpels* red. *Seed* solitary, scrobiculate.

5. **O. polycarpa,** *A. DC. in Mem. Soc. Genev.* v. 39; leaves ovate-oblong or lanceolate obtusely acuminate glabrous, peduncles axillary or supra-axillary slender 1–3-flowered sparsely hairy, stamens 6, carpels pisiform glabrous long-stalked. *H. f. & T. Fl. Ind.* 111; *Wall. Cat.* 6431. *Griffith Ic. Pl. Ind. Or.* iv. t. 654.

MARTABAN, *Wallich*; ANDAMANS, *Kurz.*

A tree?; branchlets slender, pubescent. *Leaves* 4–5 by 1–1¾ in., thin, coriaceous, points long, shining above; petiole $\frac{1}{12}$ in. *Peduncle* 1–2 in., slender; bracts several, small, remote, linear. *Sepals* ovate, acute, ciliate. *Outer petals* orbicular, ciliate; inner twice as large, tip and margins downy. *Carpels* 9–12; stalk nearly as long.—Our specimens have bud and fruit only.

6. **O. acuminata,** *A. DC. in Mem. Soc. Genev.* v. 39; leaves oblong or lanceolate long and finely acuminate glabrous above softly pubescent on the midrib and veins beneath, peduncle 1–3-flowered axillary or supra-axillary slender, stamens 6. *H. f. & T. Fl. Ind.* 112; *Wall. Cat.* 6432.

TENASSERIM, *Wallich.*

A tree; branches slender, young densely pubescent. *Leaves* 4-6 by 1–1¾ in., thin, conspicuously reticulate beneath; petiole $\frac{1}{12}$–⅙ in., pubescent. *Peduncles* 1 in., pubescent; bracts several, subulate, hairy. *Sepals* minute, ovate-lanceolate, densely hairy. *Outer petals* small, ovate, thin, hairy; inner as in *O. zeylanica.* *Ovaries* 6, densely strigose; ovules 2.

7. **O. Brandisii,** *H. f. & T.*; leaves obovate-lanceolate tapering to a very slender point glabrous above hairy beneath, peduncles 2–3-flowered supra-axillary slender, stamens 12, 3 fertile and 9 imperfect.

Martaban and Pegu, *Brandis;* Pegu, *Kurz.*

Branches softly brown-tomentose. *Leaves* 6–8 by 2–3 in., thin, point very slender, base narrow rounded or subcordate; petiole $\frac{1}{12}$ in., hairy. *Flowers* $\frac{3}{4}$ in. diam.; peduncles 1–1$\frac{1}{2}$ in., pubescent; bract solitary basal. *Sepals* ovate-lanceolate, taper-pointed, softly hairy. *Outer petals* $\frac{1}{3}$ in., ovate, tomentose, veined on both surfaces; inner $\frac{2}{3}$ in., claw long narrow, limb subclavate thickened, slightly hairy, compressed, grooved in front. *Anther-cells* large, obtusely apiculate. *Ovaries* 6, oblong, softly villous with white hairs; style oblong, glabrous; ovule 1 on the ventral suture.

8. **O. enterocarpa,** *Maingay mss.;* quite glabrous, leaves elliptic or oblong-lanceolate caudate-acuminate membranous, peduncles filiform supra-axillary, carpels very slender subtorulose.

Malacca, very rare, *Maingay.*

A tree; branchlets slender, black. *Leaves* 2–4$\frac{1}{2}$ by 1–1$\frac{1}{2}$ in., base acute or rounded, very thin, nerves slender; petiole $\frac{1}{12}$ in. *Flowers* $\frac{1}{3}$ in. diam., nodding; peduncle $\frac{1}{4}$–1 in., 1-flowered; bracteole minute. *Sepals* minute. *Outer petals* ovate, acute, pubescent; inner as long, silky, claws equalling the conical cap. *Stamens* 6, with 6 staminodes. *Ovaries* about 6, cylindric, 2–4-ovuled, hirsute. *Carpels* 4–6, 3–5 by $\frac{1}{3}$–$\frac{1}{2}$ in., red. *Seeds* 2–4, linear-oblong, 1-seriate.—A very curious fruit.

23. **BOCAGEA,** St. Hilaire.

Trees. *Leaves* shining, and branches glabrous. *Flowers* small, terminal axillary or fascicled on woody tubercles, 1–2-sexual. *Sepals* orbicular or ovate, imbricate. *Petals* 6, imbricate in 2-series, nearly equal, usually orbicular, concave. *Stamens* 6–21, imbricate in 2 or more series, broadly oblong, thick, fleshy; anther-cells dorsal, oblong; connective produced. *Ovaries* 3–6; style short, stigma obtuse or capitate; ovules 1 or 2–8 on the ventral suture. *Ripe carpels* globose, stalked.—Distrib. Species about 12, tropical Asiatic and American.

1. **B. elliptica,** *H. f. & T.;* leaves narrow-oblong obtuse or acute, flowers monœcious, sepals ciliate, stamens 12–18, ovaries 3. Uvaria elliptica, *A. DC. in Mem. Soc. Genev.* v. 27; *Wall. Cat.* 6470, 7421. Sageræa elliptica, *H. f. & T. Fl. Ind.* 93. Diospyros? frondosa, *Wall. Cat.* 4125.

Tenasserim to Penang, *Wallich;* Malacca, *Maingay.*

A tree; young branches angular. *Leaves* 8–12 by 2$\frac{1}{2}$–4 in., thick, coriaceous, base acute obtuse rounded or cordate, nerves spreading; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* axillary and solitary or fascicled on cauline tubercles, small, red, "monœcious," *Maingay;* pedicels $\frac{1}{4}$ in., bracteoles several, basal, and 1 orbicular median. *Sepals* glabrous. *Petals* $\frac{1}{4}$ in. long, ovoid, ciliate. *Connective* subquadrate, anthers extrorse, *Maingay. Ovaries* glabrous, ovules about 8. *Carpels* 1 in. diam., globose, smooth, several seeded; stalk very short.

2. **B. Thwaitesii,** *H. f. & T.;* leaves narrow-oblong obtuse, flowers fascicled on the large branches 2-sexual, sepals glabrous, stamens about 21, ovaries 3, stigma 2-lobed. Sageræa Thwaitesii, *H. f. & T. Fl. Ind.* 94; *Thwaites Enum.* 6; *Beddome Ic. Pl. Ind. Or.* t. 41.

Ceylon; Ambagamowa and Saffragam districts, *Thwaites.*

A tree. *Leaves* 8–12 by 3–4$\frac{1}{2}$ in., thick, coriaceous, base rounded, pale beneath; petiole $\frac{1}{2}$–$\frac{1}{3}$ in. *Flowers* pale orange; pedicels 2–4 in.; bracteoles minute, basal. *Sepals* short, very obtuse. *Petals* $\frac{1}{2}$ in., orbicular, glabrous, outer larger. *Stamens* reddish. *Carpels* 1 in. diam., subsessile.

X 3. **B. Dalzellii,** *H. f. & T.;* leaves narrow-oblong acute or obtuse, flowers 2-sexual in fascicles of 1–15 on woody tubercles, stamens 12–18, ovaries 3–5, stigma entire. Guatteria laurifolia, *Graham Cat. Bombay Pl.* 4. Sageræa laurina, *Dalz. in Hook. Kew Journ. Bot.* iii. 207; *Bombay Flor.* 2; *H.f. & T. Fl. Ind.* 93. S. Dalzellii, *Beddome Ic. Pl. Ind. Or.* t. 42.

Forests of the CONCAN, *Graham;* and TRAVANCOR, *Beddome.*

A middle-sized tree. *Leaves* 5–9 by $1\frac{1}{2}$–2 in., thick, coriaceous, base acute or rounded; petiole $\frac{1}{4}$ in. *Flowers* crowded, white; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in.; bracteoles several, scaly, basal. *Sepals* orbicular. *Petals* $\frac{1}{2}$ in., broad-ovate. *Outer stamens* sometimes without anthers. *Ripe carpels* 1 in. diam., globose, glabrous, subsessile.

4. **B. coriacea,** *H. f. & T.;* leaves ovate-lanceolate acute or subacute, flowers 1–3 2-sexual, stamens 9, ovaries 1–2. Orophea coriacea, *Thwaites Enum.* 8; *Beddome Ic. Pl. Ind. Or.* t. 71.

CEYLON, Central Province, alt. 3000 ft., *Thwaites.*

A middle-sized tree. *Leaves* 3–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., thick, coriaceous, base rounded, dark green above, pale beneath; petiole $\frac{1}{12}$–$\frac{1}{6}$ in. *Flowers* $\frac{1}{3}$ in. diam., terminal in cauline pedicels $\frac{1}{4}$ in., bracteoles basal, strigose. *Sepals* minute, deltoid, ciliate. *Petals* orbicular, outer purple outside, orange-brown inside; inner connivent, dark purple. *Ovaries* 2-ovuled. *Carpels* $\frac{1}{2}$ in. diam., obliquely subglobose, glabrous, subsessile.—We remove this and the following from *Orophea* to *Bocagea* on account of the habit and apparently imbricate outer petals; the inner petals have no claws,

5. **B. obliqua,** *H. f. & T.;* leaves oblong or lanceolate acute or acuminate, flowers 1–3 together 2-sexual terminal or cauline, pedicels very short, stamens 6 in 2 series, ovaries 3. Orophea? obliqua, *H. f. & T. Fl. Ind.* 112; *Thwaites Enum.* 8; *Beddome Ic. Pl. Ind. Or.* t. 72.

CEYLON, in the Galle and Ratnapoora districts, *Gardner*, &c.

A middle-sized tree. *Leaves* 4–5 by $1\frac{1}{4}$-2 in., coriaceous, base oblique, pale beneath: petiole $\frac{1}{12}$ in. *Flowers* minute, purple. *Sepals* ciliate. *Petals* orbicular, outer spreading, inner connivent (imbricate or subvalvate, *Thw.*) *Ovaries* 2-ovuled, stigmas depressed. *Carpels* $\frac{1}{2}$ in. diam., red-brown.

24. KINGSTONIA, H. f. & T.

A tree. *Flowers* fascicled on cauline tubercles, 2-sexual. *Sepals* 3, bases connate ovate, acute persistent. *Petals* 6; outer ovate, valvate; inner smaller, oblong, imbricate. *Stamens* about 12, filaments half the length of the extrorse anther-cells; connective obliquely truncate. *Ovary* 1; stigma sessile peltate, crenate; ovules few. *Ripe carpel* globose. *Seeds* several, 2-seriate.

1. **K. nervosa,** *H. f. & T.;* leaves elliptic or linear-oblong acuminate glabrous or puberulous on the nerves beneath.

MALACCA, *Maingay.*

Branches woody, young rusty-pubescent. *Leaves* 4–8 by 2–3 in., base rounded, thin, coriaceous, opaque; nerves many oblique strong; petiole $\frac{1}{4}$ in., pubescent. *Flowers* $\frac{1}{4}$ in. long, in fascicles of 8–10; peduncles $\frac{1}{3}$–$\frac{1}{2}$ in., slender, rusty-pubescent; bracts small orbicular, basal, imbricate. *Sepals* $\frac{1}{12}$ in., ferruginous. *Petals* ashy-pubescent, subacute; inner one-third smaller. *Carpels* 1 in. diam., on stout woody peduncles, densely rusty-tomentose; walls very thick.—Differs from *Bocagea* in the valvate not orbicular outer petals, smaller inner, solitary carpel, and pubescent branches.

25. LONCHOMERA, H. f. & T.

A tree. *Leaves* shining. *Flowers* small, in axillary fascicles. *Sepals* 3, broad-ovate, acute. *Petals* 6, in 2 series; outer lanceolate, flat, spreading, valvate; inner smaller and broader. *Stamens* 8–12, loosely imbricate, broadly cuneate, thick; anther-cells lateral, introrse. *Torus* small, slightly concave, pubescent. *Ovary* solitary, glabrous, sessile, contracted into a very short style, stigma subcapitate; ovules 2, superposed. "*Ripe carpels* elliptic, apiculate, succulent, glabrous, 2-seeded. *Seeds* plano-convex; testa osseous." *Maingay.*

1. **L. leptopoda,** *H. f. & T.;* leaves oblong or elliptic obtusely acuminate or acute.

MALACCA, *Maingay.*

A middle-sized tree; branches black, young granulate. *Leaves* 2½–4 by 1–1½ in., concolorous, hardly shining, thin, coriaceous, base rounded or acute, reticulate on both surfaces, nerves very slender, subhorizontal; petiole ¼ in., slender, naked. *Flowers* ⅓ in. long; peduncles 2–6, ½–¾ in., hoary; bracts small, basal, obtuse. *Sepals* connate below, tomentose. *Petals* tomentose on both surfaces, inner like the outer but one-third shorter and much broader. *Ovary* ovoid.—The fruits enclosed in a cover with the specimens do not accord with Maingay's character (see Genus), they are 1¼–1½ in. long, elliptic-ovoid, top rounded, base rather contracted, walls obscurely warted. *Seed* oblong-cylindric, apparently enclosed in a dry aril which adheres vertically to one side of the cavity; albumen horny, slightly ruminated; embryo half the length of the seed, cotyledons linear-oblong, thin; radicle cylindric, ¼ the length of the cotyledons.

ORDER V. MENISPERMACEÆ. (By Hooker f. & Thomson.)

Climbing or twining rarely sarmentose shrubs. *Leaves* alternate, entire or lobed, usually palminerved; stipules 0. *Flowers* small or minute, solitary fascicled cymose or racemed, diœcious, sometimes 3-bracteolate. *Sepals* 6 (rarely 1–4, or 9–12), usually free, imbricate in 2–4 series, outer often minute. *Petals* 6 (rarely 0 or 1–5), free or connate. ♂ FLOWERS: *Stamens* hypogynous, usually one opposite each petal, filaments free or connate; anthers free or connate, 2-celled. *Rudimentary carpels* small or 0. ♀ FLOWERS: *Staminodes* 6 or 0. *Ovaries* 3 (rarely 1, or 6–12); style terminal, simple or divided; ovules solitary (2 in *Fibraurea*), usually amphitropous. *Ripe carpels* drupaceous, with the style-scar subterminal, or by excentric growth subbasal. *Seed* usually hooked or reniform, often curved round an intrusion of the endocarp (*condyle*, Miers), albumen even or ruminate or 0; cotyledons flat or semiterete, foliaceous or fleshy, appressed or spreading.—A large tropical Order; genera 32; species about 100.

In this order we adhere to the classification of the genera, and limitation of the species, adopted in our Flora Indica (1855), at variance as these are with our friend Mr. Miers' views (Contributions to Botany, iii., 1871); this we do after the careful examination of the Order by Bentham and Hooker (Gen. Plant. 1862), a further study of the Indian species by one of us in their native jungles and in the Calcutta Botanic Garden, and a review of Eichler's valuable monograph of the Brazilian species in Martius' Flora Brasiliensis (1864). The divergence between Mr. Miers' conclusions and our own amounts to his adopting for the Indian plants of the Order, 6 tribes, 26 genera, and upwards of 90 species, as against our 4 tribes, 19 genera, and 35 species. We are far from affirming that a few of our 35 species may not embrace two or more, but we find no evidence of this in the materials upon which Mr. Miers and ourselves have worked.

TRIBE I. **Tinosporeæ.** *Flowers* 3-merous. *Ovaries* usually 3. *Drupes* with a subterminal rarely ventral or subbasal style-scar. *Seed* oblong or subglobose, albumen copious or scanty; cotyledons foliaceous, usually spreading laterally.

* Drupes with a terminal or subterminal style-scar.	
Sepals 12; filaments connate	1. Aspidocarya.
Sepals 6; filaments connate	2. Parabæna.
Sepals 6; petals 6; filaments free	3. Tinospora.
Sepals 9; petals 6; filaments free	4. Tinomiscium.
Sepals 6; petals 0; filaments free	5. Fibraurea.
* Drupes with a subbasal style-scar.	
Sepals 6; filaments all connate	6. Anamirta.
Sepals 9; outer filaments free	7. Coscinium.

Tribe II. **Cocculeæ.** *Flowers* 3-merous. *Ovaries* usually 3. *Drupe* with a subbasal rarely subterminal style-scar. *Seed* horse-shoe shaped, albumen copious; embryo slender, cotyledons linear or slightly dilated.

Petals 6, minute; ovaries 3–12; style subulate	8. Tiliacora.
Petals 5–8; ovaries 3; styles compressed	9. Limacia.
Petals 6; ovaries 3–6; styles subulate	10. Cocculus.
Petals 6; ovaries 3; styles forked	11. Pericampylus.

Tribe III. **Cissampelideæ.** *Flowers* 3–5-merous. *Ovaries* usually solitary. *Drupe* with a subbasal style-scar; endocarp dorsally muricate or echinate. *Seed* horse-shoe shaped, albumen scanty; embryo linear, cotyledons appressed.

Sepals 6–10, free; petals of ♂ and ♀ 3–5 free	12. Stephania.
Sepals 4, free; petals of ♂ 4 connate, of ♀ 1	13. Cissampelos.
Sepals 4–8, connate; petals of ♂ of 4–8 connate, of ♀ 1	14. Cyclea.
Sepals 4–8, connate; petals of ♂ 0, of ♀ 2 saccate	15. Lophophyllum.

Tribe IV. **Pachygoneæ.** *Flowers* usually 3-merous. *Ovaries* usually 3. *Drupes* with a subbasal or ventral style-scar. *Seed* curved hooked or inflexed, albumen 0; cotyledons thick fleshy.

Sepals, petals and stamens, 6 each	16. Pachygone.
Sepals and petals 6 each; stamens 9	17. Pycnarrhena.
Sepals 9–12; petals and stamens 6 each	18. Hæmatocarpus.
Sepals 8; petals 2; stamens 4	19. Antitaxis.

1. ASPIDOCARYA, H. f. & T.

A climber. *Flowers* in slender panicles. *Sepals* 12, 2–4-seriate, inner broader. *Petals* 6, short, cuneate. Male fl.: *Anthers* 6, encircling the top of the staminal column, bursting transversely. Female fl.: *Staminodes* 6, clavate. *Ovaries* 3; stigmas subcapitate. *Drupes* dorsally compressed, style-scar terminal; endocarp much compressed, keeled dorsally, not intruded, margins winged, toothed. *Seed* oblong, flat; cotyledons foliaceous, base divaricate, then parallel.

1. **A. uvifera,** *H. f. & T. Fl. Ind.* 180; leaves subpeltate ovate-cordate, *Miers Contrib.* iii. 58, t. 99.

Subtropical forests of Sikkim, alt. 1-5000 ft., *H. f. & T.*

Branches slender, terete. *Leaves* 4–6 by 3–6 in., long-acuminate, tip obtuse, base sometimes subsagittate, nerves beneath hairy; petiole 3–4 in., cylindric. *Panicles* 4–8 in., pubescent. *Sepals* greenish, ciliate. *Petals* concave. *Drupes* $\frac{3}{4}$–1 in.; endocarp woody, fragile.

2. PARABÆNA, Miers.

A climber, juice milky. *Flowers* in axillary dichotomous cymes. *Sepals* 6, subequal. *Petals* much smaller. Male fl.: *Anthers* 6, horizontal, encircling the top of the staminal column, bursting transversely. FEMALE fl.: *Staminodes* 6, cylindric. *Ovaries* 3; styles subulate, recurved. *Drupes* ovoid, style-scar subterminal; endocarp subglobose, dorsally spinulose, ventrally concave. *Seed* pitted, curved, ventrally concave; cotyledons foliaceous, ovate, spreading.

1. **P. sagittata,** *Miers Contrib.* iii. 57, t. 98; leaves cordate or sagittate obtusely acuminate. *H. f. & T. Fl. Ind.* 181. P. oleracea, peterophylla, *and* ferruginea, *Miers in Tayl. Ann. Ser.* 2, vii. 39. Cissampelos sagittata, *Ham. ex Wall. Cat.* 4983. C. oleracea, *Wall. Cat.* 4984.

Tropical forests, from NIPAL and the KHASIA HILLS, to AVA and CHITTAGONG.
Glabrous pubescent or softly tomentose; branchlets grooved. *Leaves* 2–8 by 2–4 in., 5–7 nerved, young sinuate-toothed, older entire; petiole 3–4 in. *Cymes* usually geminate, many-flowered. *Flowers* minute. *Sepals* subacute. *Petals* obovate-cuneate, tip often 3-lobed. *Drupes* greenish.

3. TINOSPORA, Miers.

Climbing shrubs. *Flowers* in axillary or terminal racemes or panicles. *Sepals* 6, 2-seriate, inner larger membranous. *Petals* 6, smaller. MALE fl.: *Stamens* 6, filaments free, tips thickened; anther-cells obliquely adnate, bursting obliquely. FEMALE fl.: *Staminodes* 6, clavate. *Ovaries* 3; stigmas forked. *Drupes* 1–3, dorsally convex, ventrally flat; style-scar subterminal; endocarp rugose, dorsally keeled, ventrally concave. *Seed* grooved ventrally or curved round the intruded sub-2-lobed endocarp, albumen ventrally ruminate; cotyledons foliaceous, ovate, spreading.—DISTRIB. Species about 8, tropical Asiatic and African.

1. **T. tomentosa,** *Miers Contrib.* iii. 33; leaves orbicular-cordate more or less 3-lobed pubescent above tomentose beneath. *H. f. & T. Fl. Ind.* 183. Cocculus tomentosus, *Coleb. in Trans. Linn. Soc.* xiii. 59; *Wall. Cat.* 4956. Menisp. tomentosum, *Roxb. Fl. Ind.* iii. 813.

Tropical thickets in BENGAL, *Roxburgh*, and AVA, *Wallich*.
Bark pustular; shoots tomentose. *Leaves* 3–6 in. diam., tomentose on both surfaces; petiole as long. *Racemes* usually simple, solitary or fascicled. *Flowers* fascicled in the axils of deciduous bracts. *Drupes* pisiform, orange-yellow, endocarp tubercled.

2. **T. malabarica,** *Miers Contrib.* iii. 32; leaves ovate-cordate acuminate pubescent above almost woolly beneath. *H. f. & T. Fl. Ind.* 183. Menisp. malabaricum, *Lamk.* Cocculus malabaricus, *DC. Prodr.* i. 97; *Wall. Cat.* 4969. *Rheede Hort. Mal.* vii. t. 19.

WESTERN PENINSULA; SIKKIM; KHASIA HILLS and CHITTAGONG.
Branchlets clothed with white hairs. *Leaves* 3–6 in. diam., 7-nerved; petiole 4 in., terete, hairy. *Racemes* 3–6 in.; flowers green. *Drupes* red.—Miers distinguishes the Khasia and Chittagong specimens as var. *scabridula*.

3. **T. crispa,** *Miers Contrib.* iii. 34; leaves ovate-cordate or oblong acuminate glabrous, stamens adnate to the base of the petals, drupe elliptic-oblong. *H. f. & T. Fl. Ind.* 183. Menispermum crispum, *L.* M. verrucosum, *Roxb. Fl. Ind.* iii. 808. M. tuberculatum, *Lamk.* Cocculus crispus, *DC. Prodr.* i. 97. C. verrucosus, *Wall. Cat.* 4966 *A, B.*

From SILHET and ASSAM to PEGU and MALACCA.—DISTRIB. Malay Islands.
Bark warted; shoots glabrous. *Leaves* 2–6 by 1–4 in., entire or repand, sometimes subsagittate, basal lobes distant; petiole 1–3 in. *Racemes* 4–8 in., on the old wood, solitary or fascicled. *Flowers* 2–3 in the axils of ovate fleshy bracts, ⅙ in. long, green, campanulate.

Anthers square. *Drupes* size of an olive, pale yellow.—Miers distinguishes the Khasia plant as var. *nitidiuscula*, probably a distinct species.

4. **T. cordifolia,** *Miers Contrib.* iii. 31; leaves cordate glabrous, stamens free, ripe carpels pisiform. T. palminervis, *Miers l.c.* 31. Menisp. cordifolium, *Willd.; Roxb. Fl. Ind.* iii. 811. Cocculus cordifolius, *DC. Prodr.* i. 97; *Wall. Cat.* 4955; *W. & A. Prodr.* 12; *Wight Ic.* t. 385, 486. C. convolvulaceus, *DC. Prodr.* i. 97. C. verrucosus, *Wall. Cat.* 4966 *C, D, E*; *Rheede Hort. Mal.* vii. t. 21.

Throughout tropical India, from KUMAON to ASSAM and BIRMA, and from BEHAR and CONCAN to CEYLON and the CARNATIC.

Bark corky; shoots glabrous. *Leaves* 2–4 in. diam., acute or acuminate; petiole 1½–3 in. *Racemes* exceeding the leaves, axillary terminal or on the old wood; bracts subulate. *Flowers* yellow, males fascicled, females usually solitary, glabrous. *Petals* cuneate. *Anthers* oblong. *Drupes* size of a pea or small cherry, red.

5.? **T. uliginosa,** *Miers Contrib.* iii. 35; leaves ovate or ovate-oblong acuminate, base rounded or subcordate, veins reticulate, drupe as in *T. crispa*, but endocarp thinner.

SINGAPORE, *Maingay*.

Maingay's mss. contain an excellent analysis of the fruit of this and *T. crispa*, and the only difference between them that I perceive is that the endocarp of this is thin and crustaceous, with a deeper longitudinal groove; the cotyledons are somewhat crumpled in both. The leaves are less shining than in the original *T. uliginosa* of Java, the fruit of which is undescribed.

4. TINOMISCIUM, Miers.

A scandent shrub, juice milky. *Flowers* racemed. *Sepals* 9, with 3 bracts. *Petals* 6, oblong, margins incurved. MALE fl.: *Stamens* 6, filaments flattened; anthers oblong, adnate, bursting vertically. *Rudimentary carpels* 3. FEM. fl.: unknown. *Drupes* much compressed, ovoid-oblong, style-scar terminal; endocarp much compressed, dorsally convex, ventrally flat or slightly concave, not intruded. *Seed* almost flat, oblong; cotyledons quite flat, nearly as broad as the thin layer of albumen, very thin, closely appressed; radicle short cylindric.—DISTRIB. 3 E. Asiatic species.

1. **T. petiolare,** *Miers Contrib.* iii. 45, t. 94; leaves ovate-oblong coriaceous. *H. f. & T. Fl. Ind.* 205. Cocculus petiolaris, *Wall. Cat.* 6964.

PENANG, *Wallich*; SINGAPORE, *Maingay*.

Young shoots brown-tomentose. *Leaves* 4–6 by 2½–4 in., ovate-oblong, obtuse or acuminate, glabrous, very coriaceous, base truncate or rounded, reticulate between the 3-5-nerves; petiole 3–4 in. *Racemes* 4–10 in., on tubercles in the upper racemes, or alternate along the branches, brown-tomentose; flowers minute, solitary or fascicled; pedicels short. *Sepals* puberulous. *Petals* notched. *Drupes* ¾–1 in., endocarp thick woody.—Foliage very similar indeed to that of *Fibraurea tinctoria*, but nervules beneath prominent, reticulate.

There are two flowerless plants in Hook. Herb., both collected by Griffith, and perhaps species of *Tinomiscium;* one has membranous elliptic-lanceolate acuminate leaves, and fruit 1 in. long, with a very woody endocarp; the other has broad ovate-cordate acuminate membranous leaves, and similar but flatter fruit with a thin endocarp; this last closely resembles *T. javanicum*, Miers.

5. FIBRAUREA, Loureiro.

A lofty climbing glabrous shrub. *Leaves* ovate or oblong, coriaceous, 3-nerved. *Flowers* in large axillary panicles, diœcious. *Sepals* 6, with

3 minute bracts, inner larger. *Petals* 0. MALE fl.: *Stamens* 6, filaments clavate; anthers terminal, adnate, cells spreading, bursting vertically. FEMALE fl.: *Staminodes* 6. *Ovaries* 3, ovoid, 2-ovuled; stigma sessile, punctiform. *Drupes* 3, 1-seeded, oblong, terete, style-scar subterminal; endocarp oblong, dorsally convex, ventrally flattened and channelled, hardly intruded. *Seed* oblong, terete, reniform on a transverse section, albumen copious, horny; cotyledons foliaceous, longitudinally curved, oblong, very thin; radicle short, cylindric.

1. **F. tinctoria,** *Lour. Fl. Coch.* ii. 769; leaves 3-nerved from the base or above the base. *H. f. & T. Fl. Ind.* 204. F. tinctoria, fasciculata, *and* chloroleuca, *Miers Contrib.* iii. 41, 42, t. 93. Cocculus Fibraurea, *DC. Prodr.* i. 99.

PENANG, *Phillips;* MALACCA, *Griffith.*—DISTRIB. Cochin-China, Borneo.

Branches pale; bark lax. *Leaves* 4–7 by 2–4 in., elliptic-ovate or oblong, thick, coriaceous, obtusely acuminate, shining above, pale beneath, 3-plinerved from the base or above it; petiole 1½–3 in., striate, subangular. *Panicles* often fascicled, much branched from the base, buds globose; fruiting panicle 1 ft., woody; peduncles ½–1 in. *Drupes* 1 in.—We await evidence of there being more than one known species of this genus, pending which we adhere to the opinion expressed in Flora Indica. *Leaves* like those of *Tinomiscium petiolare*, but not reticulate beneath. As Griffith (mss in Herb. Hook.) correctly observes, there are 2 superposed ovules in each ovary, of which the upper only becomes a seed.

6. ANAMIRTA, Colebrooke.

A climbing shrub. *Flowers* panicled. *Sepals* 6, with 2 appressed bracts. *Petals* 0. MALE fl.: *Anthers* sessile, on a stout column, 2-celled bursting transversely. FEM. fl.: *Staminodes* 9, clavate, 1-seriate. *Ovaries* 3, on a short gynophore; stigma subcapitate, reflexed. *Drupes* on a 3-fid gynophore, obliquely ovoid, dorsally gibbous, style-scar subbasal; endocarp woody. *Seed* globose, embracing the subglobose hollow intruded endocarp, albumen dense, of horny granules; embryo curved, cotyledons narrow-oblong thin, spreading.

1. **A. Cocculus,** *W. & A. Prodr.* i. 446; leaves ovate or ovate-cordate rarely oblong-ovate. *H. f. & T. Fl. Ind.* 185. A. paniculata, *Coleb.* A. flavescens *and* toxifera, *Miers Contrib.* iii. 51. Menisp. Cocculus, *Linn.; Roxb. Fl. Ind.* iii. 807. M. heteroclitum, *Roxb. l.c.* 817. Cocculus lacunosus, *DC. Prodr.* i. 97. C. suberosus, *DC. l.c.; W. & A. Prodr.* i. 11; *Wall. Cat.* 4954. C. populifolius, *DC. l.c.*

EASTERN BENGAL; KHASIA HILLS; ASSAM; and from CONCAN and ORISSA to CEYLON. —DISTRIB. Malayan Islands.

Bark corky; shoots stout, glabrous, striate. *Leaves* 4–8 in. long, as broad or narrower, acute or acuminate, base rarely acute, glabrous above, hairy in the nerve-axils beneath, base 3-nerved; petiole 2–6 in. *Panicles* on the old branches, 1–1½ ft., pendulous. *Flowers* ¼ in. diam., glabrous. *Sepals* deciduous. *Drupes* ⅔ in., black, glabrous.

7. COSCINIUM, Colebrooke.

Climbing shrubs. *Flowers* in dense globose heads. *Sepals* 6, with a bract, orbicular. *Petals* 3, large, spreading, elliptic. MALE fl.: *Stamens* 6, filaments cylindric, 3 inner connate to the middle; anthers adnate, outer 1- inner 2-celled, bursting vertically. FEM. fl.: *Staminodes* 6. *Ovaries* 3–6, subglobose; styles subulate, reflexed. *Drupes* globose; endocarp bony. *Seed* globose, embracing a globose intrusion of the endocarp; albumen fleshy, ruminate in the ventral face; embryo straight, cotyledons orbicular, spreading, thin sinuate, laciniate, or fenestrate.—DISTRIB. Species 2; tropical Asiatic.

1. **C. fenestratum,** *Colebrooke in Trans. Linn. Soc.* xiii. 65; leaves slightly peltate suborbicular yellow-tomentose beneath, heads umbelled, cotyledons laciniate. *Miers in Hook. Bot. Mag.* t. 4658; *Contrib.* iii. 22, t. 88; *H. f. & T. Fl. Ind.* 178. C. Wallichianum *and* Wightianum, *Miers in Tayl. Ann. Ser.* 2, vii. 37. Menisp. fenestratum, *Gærtn.; DC. Prodr.* i. 103; *Roxb. Fl. Ind.* iii. 809. Cocculus Blumeanus, *Wall. Cat.* 4971 (*partly*). Pereira medica, *Lindl. Fl. Med.* 370.

WESTERN PENINSULA, *Herb. Wight.*; MALACCA, *Maingay;* SINCAPORE, *Wallich;* CEYLON, Central and Southern provinces. (Specimens all imperfect.)

Young shoots hoary-tomentose. *Leaves* 5–7 by 4–6 in., young oblong-deltoid obscurely peltate, acuminate, glabrous above, hoary and reticulate beneath; petiole 3–5 in. *Heads* ½–⅔ in. diam.; pedicels 1 in. *Flowers* green. *Petals* orbicular, acute, and sepals persistent. *Drupes* 1–3, ½ in. diam., subglobose, villous.—Perhaps 3 species are confounded here; Wight's has smaller broader and more membranous leaves, whiter beneath; the Malayan are more tomentose.

2. **C. Blumeanum,** *Miers Contrib.* iii. 23; leaves deeply peltate thick coriaceous ovate or oblong white-tomentose beneath, heads racemed. *H. f. & T. Fl. Ind.* 179. Cocculus Blumeanus, *Wall. Cat.* 5971 (*partly*).

PENANG, SINCAPORE and MALACCA, *Wallich*, &c.

Branches woolly. *Leaves* 7–12 by 3–6 in., peltate, obtuse or acuminate, dark green and shining above; petiole 3–5 in. *Racemes* 3–4 in., stout, tomentose, peduncles 1 in.

Maingay's collection contains fruits of a *Coscinium* from Malacca, of which he describes the cotyledons as fenestrate; the carpels are 1¼–1½ in. diam., globose, bright yellow, sarcocarp very thick, endocarp woody; seed ¾ in. diam., albumen so hard that we have failed to remove the cotyledons so as to verify Maingay's description; it was accompanied with leaves and flowers of *Fibraurea* (Distrib. Hb. Maingay, 115).

A fourth species in Maingay's herbarium has leaves like *C. fenestratum*, but more peltate, pale brown beneath, with very appressed pubescence; a similar plant grows in Java and Sumatra.

8. **TILIACORA,** Colebrooke.

A climbing shrub. *Flowers* in axillary panicles, diœcious or polygamous. *Sepals* 6, 2-seriate, outer much smaller. *Petals* 6, minute, cuneate. MALE fl.: *Stamens* 6, filaments subcylindric; anthers adnate, bursting vertically. FEM. fl.: *Rudimentary carpels* 3. *Ovaries* 3–12; styles short, subulate. *Drupes* obovoid, pedicelled, subcompressed, style-scar subbasal; endocarp thin, obscurely ribbed, grooved on both sides. *Seed* hooked, albumen oily, ruminate; cotyledons linear, fleshy, plano-convex, appressed.

1. **T. racemosa,** *Coleb. in Trans. Linn. Soc.* xiii. 67; leaves ovate or ovate-cordate acuminate. *Miers Contrib.* iii. 76, t. 104. T. fraternaria, cuspidiformis *and* abnormalis, *Miers l.c.* 77, 78. T. acuminata, *Miers in Tayl. Ann. Ser.* 2, vi. 39; *H. f. & T. Fl. Ind.* 187. Menisp. acuminatum *and* radiatum, *Lamk.* M. polycarpum, *Roxb. Fl. Ind.* iii. 816. Cocculus acuminatus, *DC. Prodr.* i. 99; *W. & A. Prodr.* i. 12. C. radiatus, *DC. l.c.* 99. D. polycarpus, *Wall. Cat.* 4958 (*excl. K. L.*)—*Rheede Hort. Mal.* vii. t. 3.

Throughout tropical India, from OUDE and BENGAL, to CONCAN, ORISSA, CEYLON and SINCAPORE.—DISTRIB. Java.

Branches glabrous. *Leaves* 3–6 by 1½–3½ in., ovate, acuminate, glabrous, base acute truncate rounded or subcordate, thin, margin undulate; petiole ½–1 in. *Panicles* 6–12 in., hoary, at length glabrous; branches 1 in., male 3–7-flowered, female simple 1-flowered; bracts oblong or subulate; flowers yellow. *Drupes* ½ in., red.—Mr. Miers (Contributions, l.c.) attributes to us the error of substituting in the Flora Indica the specific name of *acuminata* for Colebrooke's prior name of *racemosa;* in this we followed his paper in Taylor's Annals.

9. **LIMACIA,** Loureiro.

Climbing shrubs. *Flowers* in panicles. *Sepals* 6, 2-seriate, outer smaller. *Petals* 6 (or 3 ?) much smaller, auricled, embracing the stamens. Male fl.: *Stamens* 3–9; anthers adnate, bursting vertically. Fem. fl.: *Staminodes* 6, clavate. *Ovaries* 3; styles short, compressed. *Drupes* obovoid or reniform, style-scar subbasal; endocarp 3-celled, 2 lateral cells empty. *Seed* elongate, embracing the intruded endocarp; embryo slender, cotyledons elongate, ½-terete, appressed.—Distrib. Tropical Asia and Africa.

* *Sepals* 8–12, *inner imbricate.* Hypserpa, *Miers.*

1. **L. cuspidata,** *H. f. & T. Fl. Ind.* 189; leaves ovate or oblong-lanceolate acuminate glabrous. Cocculus cuspidatus, *Wall. Cat.* 4960. Hypserpa cuspidata, prævaricata, pauciflora *and* uniflora, *Miers Contrib.* iii. 102–107, t. 108.

Tropical forests of Eastern Bengal, the Eastern Peninsula, and Ceylon.—Distrib. Malayan Archipelago.

Branchlets striate, pubescent. *Leaves* 2–5 by 1–2 in., thin, shining, 3-nerved, base rounded or cuneate, old glabrous; petiole ½–1 in. *Panicles* axillary and supra-axillary, solitary or geminate, female simple shorter; bracts minute, subulate. *Drupes* ½ in. long.

** *Sepals* 6–9, *inner valvate or subvalvate.*

2. **L. triandra,** *Miers Contrib.* iii. 112; leaves oblong-lanceolate acute glabrous, panicles 1–1½ in. racemed shorter than the leaves, stamens 3. *H. f. & T. Fl. Ind.* 188. L. Amherstiana *and* Wallichiana, *Miers l.c.* 112, 113. Menisp. triandrum, *Roxb. Fl. Ind.* iii. 816. Cocculus triandrus, *Colebrooke in Trans. Linn. Soc.* xii. 64; *Wall. Cat.* 4962, 4959 C, 4958 L.

From Pegu and Tenasserim to Penang.

Branches puberulous, then glabrate. *Leaves* 2–4 by ¾–½ in., thin, triplinerved, base rounded; petiole ½ in. *Panicle* puberulous; bracts minute, deciduous, 3–5-flowered; flowers very minute, yellow. *Outer sepals* minute, inner oblong. *Filaments* cuneate-oblong, fleshy; anther-cells spreading.

3. **L. oblonga,** *Miers Contrib.* iii. 109; branches pubescent, leaves oblong or lanceolate glabrous, panicle 3–8 in., stamens 6.—*H. f. & T. Fl. Ind.* 189. Cocculus oblongus, *Wall. Cat.* 4963.

Penang, Malacca, and Singapore, *Wallich*, &c.

Pubescence fulvous. *Leaves* 3–8 by 1–4½ in., acute or acuminate, base subacute or rounded; petiole ⅔–1½ in., and nerves beneath pubescent. *Panicles* supra-axillary; female solitary, males 2–3 superposed, branches 1–2 in. *Outer sepals* minute, inner thick, tomentose, subvalvate. *Drupes* subglobose.

4. **L. velutina,** *Miers Contrib.* iii. 110; stem velvety, leaves oblong or ovate-oblong tomentose beneath or on both surfaces, panicles few-flowered, stamens 6. *H. f. & T. Fl. Ind.* 189. L. distincta *and* inornata, *Miers l.c.* iii. t. 109. Cocculus velutinus, *Wall. Cat.* 4970.

From Mergui to Malacca, Penang and Sincapore, &c.

Pubescence yellowish. *Leaves* 2–6 by ¾–4 in., variable, obtuse acute or rounded, base rounded or acute, triple-nerved, usually glabrous above; petiole ½–1¼ in. *Panicles* axillary or supra-axillary, solitary few or many, tomentose, flowers villous. *Inner sepals* orbicular, valvate. *Drupes* 1 in. long, obovoid, compressed, glabrous.

Aristega lævifolia, Miers Contrib. iii. 376, t. 151, a plant collected by Helfer in the Andamans, or in Moulmein, and of which male flowers alone are known, is probably a 3-petalous *Limacia.*

10. **COCCULUS,** DC.

Climbing or sarmentose shrubs, rarely suberect. *Petiole* not dilated at the base. *Flowers* panicled. *Sepals* 6, 2-seriate, outer smaller. *Petals* 6, smaller, usually auricled. Male fl.: *Stamens* embraced by the petals, anthers subglobose, cells bursting transversely. Fem. fl.: *Staminodes* 6 or 0. *Ovaries* 3–6; styles usually cylindric. *Drupes* laterally compressed; endocarp horseshoe-shaped, dorsally keeled and tubercled, sides excavate. *Seed* curved, albumen fleshy; embryo annular, cotyledons linear, flat, appressed.—Distrib. All warm climates.

1. **C. macrocarpus,** *W. & A. Prodr.* 13; leaves suborbicular glabrous long-petioled, panicles 6–12 in., drupes obovoid-oblong. *H. f. & T. Fl. Ind.* 191; *Wight Ill.* i. t. 7. Diploclisia macrocarpa, lepida, inclyta *and* pictinervis, *Miers Contrib.* iii. 280–284, t. 127. Quinio cocculoides, *Schlecht. in Linnæa* xxvi. 732.

From the Concan southwards, and in Ceylon.—Distrib. China.

Branchlets dark grey, striate. *Leaves* 2–3 in., rather broader than long, 5-nerved, obtuse retuse or rarely acute, subrepand, glaucous beneath, base truncate or cordate; petiole 2–4 in. *Panicles* chiefly in the old branches; flowers corymbose or fascicled, or axillary. *Sepals* membranous, and 3-lobed petals streaked with purple. *Drupe* 1 in., endocarp thin, woody.

2. **C. laurifolius,** *DC. Prodr.* i. 100; a tree, leaves lanceolate short-petioled shining, panicles axillary shorter than the leaves. *Deless. Ic. Sel.* i. t. 97; *Wall. Cat.* 4965; *H. f. & T. Fl. Ind.* 191. Menisp. laurifolium, *Roxb. Fl. Ind.* iii. 815. Holopeira laurifolia, australis *and* fusiformis, *Miers Contrib.* iii. 276.

Subtropical Himalaya, alt. 2500 ft., from Nipal to Jamu, *Wallich*, &c.—Distrib. Japan, Java (cult.?).

Trunk short; branches pendulous, angled, striate, smooth, branchlets bearded at the base. *Leaves* 3–6 by 1–1½ in., coriaceous, acute or acuminate, 3-nerved; petiole ⅓–½ in. *Panicles* 1–2 in., solitary or 2 superposed, corymbose, male largest; bracts and flowers minute. *Sepals* acute. *Petals* 2-lobed. *Styles* reflexed. *Drupes* minute, globose; endocarp fragile, rugose.

3. **C. villosus,** *DC. Prod.* i. 98; branchlets villous, leaves ovate-oblong subdeltoid villous, male fl. in short panicles, fem. 1–3 axillary rarely racemed. *Wall. Cat.* 4957; *W. & A. Prod.* 13; *H. f. & T. Fl. Ind.* 193. C. sepium, *Coleb. in Trans. Linn. Soc.* xiii. 58. C. hastatus *and* aristolochiæ, *DC. l.c.* 98. Menisp. villosum, *Lamk.* (*not Roxb.*). M. hirsutum, *Linn.*; *Roxb. Fl. Ind.* iii. 814. M. myosotoides, *Linn.* Holopeira villosa, læviuscula *and* auriculata, *Miers Contrib.* iii. 271–273, t. 126.

Throughout tropical and subtropical India, from the base of the Himalaya to Malabar and Pegu (absent in the Eastern Peninsula and Ceylon).—Distrib. Trop. Africa.

Leaves 2–3 by 1½–2 in., sometimes sublanceolate, retuse or obtuse and mucronate, sometimes 3-lobed, base subcordate or truncate, young villous on both surfaces; petiole ½ in. *Panicles* loosely villous; bracts minute, linear. *Drupes* black-purple, endocarp acutely keeled, tubercled.

4. **C. mollis,** *Wall. Cat.* 4973; branchlets pubescent, leaves ovate acute or acuminate white and villous beneath, panicles few-flowered. Nephroica mollis, *Miers Contrib.* iii. 265.

Nipal, *Wallich;* Khasia hills, alt. 5000 ft., *H. f. & T.*

Branchlets striate. *Leaves* 2–4 by 1½–2½ in., of shoots often obtuse, base cordate or truncate, bright green above, at length glabrate; petiole ¾–1 in. *Panicles* axillary or nearly so, on a tomentose tubercle, shorter than the leaves, males irregular cymose, cymes 4–7-flowered, bracts filiform; females 1–3-flowered. *Petals* notched. *Drupes* pisiform, compressed; endocarp keeled, with 4 rows of tubercles.

5. **C. Leæba,** *DC. Prodr.* i. 99; branchlets puberulous, leaves linear-oblong oblong or trapezoid entire or lobed glabrate, flowers fascicled in the axils, females subsolitary. *H. f. & T. Fl. Ind.* 192; *Miers Contrib.* iii. 256. C. lævis, *Wall. Cat.* 4975. C. glabra, *W. & A. Prodr.* i. 13; *Miers l.c.* 257. C. recisus, *Miers l.c.* 258.

Drier parts of Western India; the Punjab, Sindh, and the Carnatic.—Distrib. Affghanistan, Arabia, trop. and subtrop. Africa.

Branchlets long, slender. *Leaves* ½–1½ by ¼–¾ in., very variable, angles rounded, sometimes 3–5-lobed, usually obtuse and mucronate, base cuneate or rounded, young hoary, old often glaucous on both surfaces; pedicels ⅙–¼ in. *Flowers* fascicled on woody tubercles, pedicels 1-flowered, males dense. *Drupes* 1/12–⅙ in.

11. **PERICAMPYLUS,** Miers.

A climbing shrub. *Leaves* subpeltate, petioles slender, articulate. *Flowers* in axillary cymes. *Sepals* 6, with 3 bracts, outer smaller, inner spathulate. *Petals* 6, cuneate. Male fl.: *Stamens* 6, filaments cylindric; anthers adnate, bursting transversely. Female fl.: *Staminodes* 6, clavate. *Ovaries* 3; styles 2-partite, segments subulate. *Drupes* subglobose; endocarp horseshoe-shaped, dorsally crested and echinate, sides excavated. *Seed* curved; cotyledons elongate flat, scarcely broader than the radicle.

1. **P. incanus,** *Miers Contrib.* iii. 118, t. 3; leaves suborbicular obtuse acute or retuse. P. aduncus, assamicus *and* membranaceus, *Miers l.c.* 119–122. Cocculus incanus, *Coleb. in Trans. Linn. Soc.* xiii. 57. Cissampelos mauritiana, *Wall. Cat.* 4980 (*not of DC.*). Menisp. villosum, *Roxb. Fl. Ind.* iii. 812 (*not of Lamk.*).

Sikkim, Assam, the Khasia hills, Chittagong and throughout the Eastern Peninsula.—Distrib. Java.

Branchlets tomentose, then glabrate. *Leaves* 2–4 in. diam., base truncate or subcordate; petiole 1–2 in. *Cymes* 2–3-chotomous, often many and superposed; peduncles 1–2 in., axillary, many-flowered; bracts subulate. *Sepals* villous. *Petals* acute or obtuse, margins incurved. *Drupes* red.

12. **STEPHANIA,** Loureiro.

Climbing shrubs. *Leaves* usually peltate. *Flowers* in axillary, cymose umbels. Male fl.: *Sepals* 6–10, free, ovate or obovate. *Petals* 3–5, obovate, fleshy. *Anthers* 6, connate, encircling the top of the staminal column, bursting transversely. Fem. fl.: *Sepals* 3–5. *Petals* of the male. *Staminodes* 0. *Ovary* 1; style 3–6-partite. *Drupe* glabrous; endocarp compressed, horseshoe-shaped, dorsally tubercled, sides hollowed and perforated. *Seed* almost annular; cotyledons long, slender, ½-terete, appressed.—Distrib. Tropics of the Old World.

1. **S. hernandifolia,** *Walp. Rep.* i. 96; branchlets glabrous, leaves ovate or subdeltoid acute obtuse or acuminate, umbels capitate. *H. f. & T. Fl. Ind.* 196; *Miers Contrib.* iii. 222. S. intertexta, latifolia, *and* hypoglauca, *Miers l.c.* 224, 226, 227. Cissampelos hernandifolia, *Willd.; DC. Prodr.* i. 100; *Roxb. Fl. Ind.* iii. 842; *Wall. Cat.* 4977 *D, E, F, G, H, K.* C. discolor, *DC. l.c.* i. 101. C. hexandra, *Roxb. l.c.* iii. 842. Clypea hernandifolia, *W. & A. Prod.* i. 14; *Wight Ic.* t. 939.

From Nipal to Chittagong, Singapore, and Ceylon.—Distrib. Malay Islands, trop. Australia, Africa.

Branchlets striate. *Leaves* 3–6 in. diam., base truncate or subcordate, glabrous or thinly pubescent below only or on both surfaces, pale or glaucous beneath; petiole 1½–4 in. *Peduncles* axillary, short or long; rays 8–12, with subulate bracts. *Sepals* obovate, obtuse. *Petals* 3–4. *Drupes* red.—There are two marked varieties, the Northern and Eastern, with peduncles and leaves beneath more or less pubescent, and the Western one with these parts nearly glabrous.

2. **S. elegans,** *H. f. & T. Fl. Ind.* 195; branchlets glabrous, leaves elongate-deltoid acuminate base truncate or cordate, umbels lax long-peduncled. *Miers Contrib.* iii. 227.

Subtropical Himalaya from Kumaon to Sikkim, alt. 6–7000 ft.; Khasia hills, *H. f. & T.*

Branches slender, angled. *Leaves* 2½–4 by 1–2⅓ in., sometimes obtuse, thin, coriaceous, pale beneath; petiole 1–2 in., slender. *Umbels* with many rays, sometimes branched; flowers purple or greenish, odour heavy. *Sepals* acuminate. *Petals* obovate. *Drupe* small, red.

3. **S. rotunda,** *Lour. Fl. Coch.* 747; branchlets glabrous, leaves broad-ovate or suborbicular often repand or sinuate-lobed glabrous, umbels in lax cymes. *H. f. & T. Fl. Ind.* 197; *Miers Contrib.* iii. 215. C. longa (*Khasia specimens*), japonica, Roxburghiana, glabra *and* glandulifera, *Miers l.c.* 213–220, t. 119. Cocculus Roxburghianus, *Wall. Cat.* 4972 (*not of DC.*); *W. & A. Prodr.* i. 450 *in note.* C. Finlaysonianus, *Wall. Cat.* 4974. Cissampelos glabra, *Roxb. Fl. Ind.* iii. 840. Clypea Wightii, *Arn. in Wight Ill.* i. 22.

Tropical and Temperate Himalaya, ascending to 7000 ft., from Sindh eastward to the Khasia hills and Pegu. Southern hills of the Western Peninsula.—Distrib. Siam, Cochin-China.

Roots subglobose. *Leaves* 3–7 in. diam., obtuse acute or acuminate, pale beneath, petiole 3–9 in. *Peduncles* variable, usually slender, of the females stout; rays of umbels long or short; bracts subulate; flowers ⅙–¼ in. diam., yellow. *Sepals* narrow cuneate, puberulous. *Petals* shorter. *Drupe* pisiform.

13. **CISSAMPELOS,** Linn.

Suberect or climbing shrubs. *Leaves* often peltate. Male fl.: cymose. *Sepals* 4, (5–6) erose. *Petals* 4, connate, forming in 4-lobed cup. *Anthers* 4, connate, encircling the top of the staminal column, bursting transversely. Fem. fl.: racemed, crowded in the axils of leafy bracts. *Sepals* 2 (or sepal and petal 1 each), 2-nerved, adnate to the bracts. *Staminodes* 0. *Ovary* 1; style short, 3-fid or 3-toothed. *Drupe* ovoid, style-scar subbasal; endocarp horseshoe-shaped, compressed, dorsally tubercled, sides excavated. *Seed* curved; embryo slender; cotyledons narrow, ½-terete, appressed.—Distrib. All hot climates.

1. **C. Pareira,** *Linn.*; climbing, leaves orbicular-reniform or cordate, male cymes long-peduncled many flowered hairy, female racemes with

large reniform or orbicular bracts, drupes subglobose hirsute. *DC. Prodr.* i. 100; *H. f. & T. Fl. Ind.* 198; *Miers Contrib.* iii. 139, C. caapeba, *Linn.; Roxb. Fl. Ind.* iii. 842. C. convolvulacea, *Willd.; Wall. Cat.* 4979; *W. & A. Prodr.* i. 14; *Roxb. l.c.* 842. C. orbiculata, discolor, *and* hirsuta, *Buch.; DC. l.c.* 101. C. hernandifolia, *Wall. Cat.* 4979, partly. C. obtecta, *Wall. Cat.* 4981 C. diversa, elata, grallatoria, eriantha, *and* delicatula, *Miers l.c.* 187–197. C. subpeltata, *Thwaites Enum.* 13 *and* 399, *Miers l.c.* 195. Menisp. orbiculatum, *Linn.* Cocculus orbiculatus, *DC. l.c.* 98. C. villosus, *Wall. Cat.* 4957 *in part, and* C. membranaceus, 4967 (*diseased state*).

Tropical and subtropical India, from SINDH and the PUNJAB to CEYLON and SINCAPORE.—DISTRIB. Cosmopolitan in warm regions.

A lofty climber; branchlets rarely glabrous. *Leaves* 1–4 in. diam., usually peltate, obtuse and mucronate, rarely acute, base truncate or more or less cordate; petiole equalling the leaf or longer. *Male cymes* ½–1½ in. (sometimes replaced by a shoot with small leaves and small axillary cymes), axillary or nearly so, usually 2–3 superposed, decompound; bracts minute, rarely foliaceous; peduncle slender, pubescent tomentose or hirsute. *Fem. racemes* 1–2, axillary; bracts lax or densely imbricate, usually hoary, sometimes petioled; pedicels very short. *Ovaries* rarely glabrate. *Drupe* ⅙ in. diam., scarlet.—A careful reconsideration of the materials discussed in "Flora Indica," with many additional specimens, and an eight years' further familiarity in India with both native and cultivated forms, convince us that the view taken in the above work (which is that of Eichler, Bentham, and Thwaites) is not invalidated by the vigorous attacks of our friend Mr. Miers.

14. **CYCLEA,** Arnott.

Climbing shrubs. *Leaves* usually peltate. *Flowers* in axillary panicles; MALE fl.: *Sepals* 4–8, connate into an inflated 4–5-lobed calyx. *Petals* 4–8, more or less connate into a 4–5-lobed corolla. *Anthers* 4–6, connate, crowning the staminal column, bursting transversely. FEM. fl.: *Sepal* 1, oblong. *Petal* 1, orbicular. *Ovary* 1; style short, 3–5-lobed, lobes radiating. *Drupe* ovoid, style-scar subbasal; endocarp horseshoe-shaped, dorsally tubercled, sides convex 2-locellate (as in *Limacia*). *Seed* curved; cotyledons slender, ½-terete, appressed.—DISTRIB. Tropical Asia.

1. **C. Burmanni,** *Miers Contrib.* iii. 239, t. 121; leaves peltate elongate-deltoid acuminate base cordate or subsagittate subrepand, calyx subglobose 6–8-lobed, corolla urceolate subentire. *H. f. & T. Fl. Ind.* 201. Cocculus Burmanni, *DC. Prodr.* i. 96. Clypea Burmanni, *W. & A. Prodr. in part; Burm. Fl. Zeyl.*, t. 101. Rhaptomeris Burmanni, *Miers in Tayl. Ann. Ser.* 2, vii. 41.

CONCAN, *Gibson;* and CEYLON, ascending to 2600 ft.

Branches pilose or glabrate. *Leaves* 2–4 by ¾–2 in., thin, coriaceous, shining above, usually pubescent beneath; petiole ½–1¼ in. *Panicles* equalling or exceeding the leaves, many-flowered, pubescent. *Male fl.* and *drupe* pilose. *Calyx* much exceeding the corolla.

2. **C. peltata,** *H. f. & T. Fl. Ind.* 201; leaves peltate deltoid acute or subacute, calyx campanulate 4-lobed, corolla an irregularly 4-lobed cup. *Miers Contrib.* iii. 236. C. barbata, versicolor, Arnottii, laxiflora *and* debiliflora, *Miers l.c.* 237–242. Menisp. peltatum, *Lamk.* Cocculus peltatus, *DC. Prodr.* i. 96. Cissampelos discolor, *Wall. Cat.* 4892, *in part.* C. barbata, *Wall. Cat.* 4978. Clypea Burmanni, *W. & A. Prodr.* i. 74 *in part.* Cyclea Burmanni, *Arnott in Wight Ill.* i. 22. Rhaptomeris Burmanni, *Miers in Tayl. Ann. Ser.* 2, vii. 41. *Rheede Hort. Mal.* vii. t. 49.

From Assam and the Khasia hills eastwards; and throughout the Western and Eastern Peninsula and Ceylon.—Distrib. Java, &c.

Branches grooved, sparsely clothed with reflexed hairs or glabrate. *Leaves* 3–6 by 2–4 in., thin, coriaceous, acute or obtuse, subrepand, ciliate, above glabrous or sparsely pilose, usually pubescent beneath; petiole 1–2½ in. *Panicles* equalling or exceeding the leaves; males sometimes 1 ft.; fem. much shorter; bracts oblong or subulate; *male flowers* hispid or glabrous. *Calyx* much exceeding the corolla. *Drupe* pilose.—The synonymy of this species is much confused with that of *C. Burmanni*, and owing to some of the authentic specimens being flowerless these may require revision.

15. **LOPHOPHYLLUM**, Griffith.

Characters of Cyclea, but male flowers apetalous and female with 2 opposite fleshy saccate sepals.

1. **L. bicristatum,** *Griff. Not. Pl. Asiat. part* iv. 313. t. 491; *It. Notes.* 114 No. 190, and 165 No. 854; leaves broadly cordate acuminate 7–9-nerved. Peraphora robusta, *Miers Contrib.* iii. 245, t. 122. Cyclea populifolia, *H. f. & T. Fl. Ind.* 202.

Eastern Himalaya, in Sikkim and Bhotan, *Griffith*, &c.; Khasia hills, *H. f. & T.*

A tall climber; bark white; branchlets pubescent. *Leaves* 4–6 by 3–6 in., firm, coriaceous, glabrous above, pilose with rigid hairs and reticulate beneath; petiole 2–4 in., cylindric, pubescent, base and tip thickened. *Panicles* slender, decompound, fascicled, tomentose. *Calyx* globose, 4-lobed. *Anthers* 4–5, connate into a peltate disk. *Drupe* ¼ in. diam., subglobose; endocarp with 3 series of hooked spines on each edge.

16. **PACHYGONE**, Miers.

A climbing shrub. *Flowers* axillary, racemed, diœcious. *Sepals* 6, 2-seriate, outer smaller. *Petals* 6, much smaller, base auricled embracing the filament. Male fl.: *Stamens* 6, filament incurved; anthers subglobose, didymous, bursting transversely. *Rudimentary carpels* 3, minute. Fem. fl.: *Staminodes* 6. *Ovaries* 3; styles stout, horizontal. *Drupes* reniform, style-scar subbasal; endocarp reniform, rugulose. *Seed* horseshoe-shaped, albumen 0; cotyledons ½-cylindric, very thick, hard; radicle very short.

1. **P. ovata,** *Miers Contrib.* iii. 331, t. 135; leaves ovate-oblong or subtrapezoid, male racemes exceeding the leaves. *H. f. & T. Fl. Ind.* 203. P. Plukenetii, concinna, adversa, *and* odorifera, *Miers l.c.* 330–334. Cissampelos ovata, *Poir.*; *DC. Prodr.* i. 102. C. Plukenetii, *DC. l.c.* i. 97; *W. & A. Prodr.* i. 14; *Wight Ic.* t. 824, 825. C. Wightianus, *Wall. Cat.* 4959 *A.* C. officinarum, *Pluk.* Koon zeylanicus, *Gærtn. Fruct.* ii. 486, t. 180.

Dry maritime places in the Carnatic and Ceylon.—Distrib. Java and Timor.

A lofty climber; branches tomentose. *Leaves* 1½–2 by ¾–1¼ in., thick, coriaceous, obtuse retuse or mucronate, base cuneate or rounded, 3–5-nerved, glabrous; petiole ½–¾ in., with a basal ring of hairs; tip thickened. *Racemes* slender, pubescent, females shortest; peduncles very short. *Flowers* minute, male in the axils of subulate bracts, female solitary. *Petals* 2-toothed. *Drupes* pisiform.

17. **PYCNARRHENA**, Miers.

Suberect or climbing shrubs. *Flowers* axillary, fascicled or shortly panicled, diœcious. Male fl.: *Sepals* 6, with 3 bracts, inner larger orbicular. *Petals* 6, small, lobed. *Stamens* 9, filaments very short; anthers subdidymous, bursting transversely. Fem. fl.: unknown. *Drupe* broadly oblong, subgibbous, style-scar lateral; endocarp subreniform. *Seed* slightly concave ventrally, albumen 0: cotyledons oblong, $\frac{1}{2}$-terete, very thick, slightly incurved, radicle minute, ventral.—DISTRIB. Two species, an Indian and Bornean.

1. **P. pleniflora,** *Miers Contrib.* iii. 353, t. 141; leaves oblong-lanceolate quite glabrous. P. planiflora, *H. f. & T. Fl. Ind.* 206. Cocculus planiflorus, *Wall. Cat.* 4961 (*error for* pleniflorus).

SILHET, *Wallich.*

Branches striate, puberulous. *Leaves* 5–7 by $1\frac{3}{4}$–$2\frac{1}{2}$ in., thin, coriaceous, obtusely acuminate, puberulous on the midrib beneath, reticulate; nerves prominent beneath, arching within the margin; petiole $\frac{3}{4}$ in., top clavate. *Flowers* almost capitate; peduncles $\frac{1}{6}$–$\frac{1}{4}$ in., pubescent, 1–2-flowered, with 2 basal and a median bract. *Drupes* $\frac{1}{2}$ in., smooth—P. mecistophylla, *Miers l.c.* 353, from Assam (Griffith), described from leaves only, does not appear to us to be congeneric.

18. **HÆMATOCARPUS,** Miers.

A strong glabrous climber. *Leaves* very coriaceous, 3-nerved. *Flowers* in axillary racemes, diœcious. MALE fl.: *Sepals* 9–12 with 3 bracts, large. *Petals* 6, base minutely auricled. *Stamens* 6, free; anther-cells 2, remote on the face of a large galeate dilated connective, bursting obliquely. *Rudimentary carpels* 3, minute. FEM. fl.: unknown. *Drupes* 1–4, large, ovoid fleshy, oblong, stalked, style-scar subbasal; endocarp coriaceous, oblong, adherent. *Seed* oblong, albumen 0; embryo large, cotyledons accumbent, folded on themselves, very thick, $\frac{1}{2}$-terete, obtuse; radicle short, stout, inferior.

1. **H. Thomsoni,** *Miers Contrib.* iii. 325, t. 134; leaves oblong obtusely acuminate. F. comptus *and* incusus, *Miers l.c.* 326, 327. Baterium validum, *Miers in Tayl. Annal. Ser.* 3, xiii. 124. Fibraurea? hæmatocarpa, *H. f. & T. Fl. Ind.* 204.

SIKKIM-HIMALAYA and KHASIA HILLS, alt., 3–4000 ft., *Griffith,* &c.

Branches stout, pale. *Leaves* 3–4 by $1\frac{1}{2}$–2 in., base obtuse or acute, pale or glabrous beneath, nerves reticulate; petiole slender, $\frac{3}{4}$–1 in. *Racemes* supra-axillary, solitary or several, slender, branches short; *flowers* small; pedicels slender. *Sepals* ciliate. *Petals* concave. *Fruiting racemes* woody, 1–3 in.; torus globose with 4–6 scars. *Drupes* $1\frac{1}{2}$–2 in., smooth, suboblique; stalks $\frac{1}{2}$ in., stout; sarcocarp hard, blood-red; mesocarp traversed by stout vessels from the thin crustaceous endocarp.

19. **ANTITAXIS,** Miers.

A shrub. *Leaves* penninerved. *Flowers* in axillary fascicles, diœcious. MALE fl.: *Sepals* 8, in decussate pairs; outer small; 2 next obovate; 4 inner larger, orbicular, imbricate. *Petals* 2, obovate. *Stamens* 4, filaments clavate; anthers 1-celled, subglobose, bursting transversely. FEM. fl.: unknown. *Drupes* 1–3, subglobose, style-scar ventral; endocarp thin, fragile, subreniform-oblong. *Seed* subglobose, concave ventrally, albumen 0; cotyledons oblong, $\frac{1}{2}$-terete, slightly incurved, very thick; radicle minute, ventral.—DISTRIB. Eastern Archipelago.

1. **A. fasciculata,** *Miers Contrib.* iii. 336, t. 142; leaves oblong acuminate glabrous, petiole tomentose. Cocculus lucidus, *Teysm. & Ben. Nat. Tijdsch.* iv. 397.

MALACCA, *Griffith.*—DISTRIB. Java.

Branches rigid, flexuous, smooth; young pubescent. *Leaves* 3½–4 by 1½–1¾ in., subcoriaceous, base rounded, concolorous, shining above, paler beneath with reticulate veins; petiole ¾ in. *Peduncles* of male numerous, ½–¾ in., slender, glabrous. *Flowers* minute. *Drupes* tomentose.—A very anomalous genus.

ORDER VI. **BERBERIDEÆ.** (By Hooker f. & Thomson.)

Usually shrubby, sometimes climbing, glabrous plants. *Leaves* simple or compound, with articulate segments; buds scaly. *Stipules* very rare (*Berberis*). *Flowers* often globose, regular, solitary or in simple or compound racemes, usually yellow or white. *Sepals* and *petals* free, hypogynous, very caducous, 2–many-seriate, in 3- rarely 4–6-nary whorls, imbricate, or the sepals rarely valvate. *Stamens* 4–6 (rarely 8) opposite the petals, free or connate; anthers adnate, erect, dehiscing by lateral or dorsal slits, or by 2 revolute or ascending lids or valves. *Carpels* 1–3, rarely more, oblong; style short or 0, stigma dilated or conic or oblong; ovules usually indefinite on the ventral suture or covering the walls of the ovary, anatropous rarely orthotropous. *Ripe carpels* dry or fleshy, dehiscent or not. *Seeds* with a crustaceous fleshy or bony testa; albumen copious, dense; embryo minute or long, straight or curved, radicle next the hilum.—DISTRIB. Genera about 20, with 200 species, chiefly temperate and mountain plants.

TRIBE I. **Lardizabaleæ.** *Stem* usually climbing. *Flowers* unisexual or polygamous. *Carpels* 3. *Seeds* usually large, testa bony.

An erect shrub. Leaves pinnate	1. DECAISNEA.
Climbing shrubs Leaves digitate. Stamens monadelphous . .	2. PARVATIA.
Stamens free	3. HOLBŒLLIA.

TRIBE II. **Berbereæ.** *Stem* 0 or erect. *Flowers* hermaphrodite. *Carpel* 1. *Seeds* usually small.

Ovules erect, basal. Shrubs. Fruit berried	4. BERBERIS.
Ovules superposed along the ventral suture.	
Leaves decompound. Ovules few	5. EPIMEDIUM.
Leaves simple, palmate. Ovules many	6. PODOPHYLLUM.

1. **DECAISNEA,** H. f. & T.

An erect shrub. *Leaves* unequally pinnate, petiole jointed at base. *Flowers* racemose, monœcious. *Sepals* 6, narrow, taper-pointed, subimbricate in 2 rows. *Petals* 0. MALE fl.: *Stamens* 6, monadelphous; anthers oblong, connective subulate. FEM. fl.: *Staminodes* 6, small, free. *Ovaries* 3, subsessile, oblong; stigma subsessile, oblong; ovules many, 2-seriate. *Fruit* of 3 spreading fleshy many-seeded follicles. *Seeds* large, compressed, testa bony.

D. insignis, *H. f. & T. in Proc. Linn. Soc.* 1854, ii. 349; *Fl. Ind.* 213; leaflets opposite ovate or ovate-lanceolate long acuminate. *Hook. f. Ill. Him. Pl.* t. 10. Slackea insignis, *Griff. Itin. Not.* 187.

Forests of the EASTERN HIMALAYA, alt. 6–10,000 ft.; in Bhotan, *Griffith*, and Sikkim, *H. f.*

Stem naked, erect, simple, or forked. *Leaves* 2–3 ft., subterminal on the few short branches. *Leaflets* 6–8 pair, 3–5 by 1½–3 in., thin, glaucous beneath; petiole ¼–½ in.

Racemes 1 ft., horizontal, fascicled, terminal or leaf-opposed. *Flowers* 1 in. long, pendulous, yellow-green; pedicels as long; bracts small, subulate, deciduous. *Follicles* 3 in., cylindric, obtuse, recurved, edible.

2. **PARVATIA,** Decaisne.

A large climbing shrub. *Leaves* alternate, 3-foliolate. *Flowers* racemed, monœcious. *Sepals* 6, 2-seriate, 3 outer valvate. *Petals* 6, lanceolate, much smaller. MALE fl.: *Stamens* 3, monadelphous; anthers oblong, apiculate. FEM. fl.: *Staminodes* 6, minute, free. *Ovaries* 3; stigma sessile, oblong, acute; ovules many, covering the walls of the ovary, mixed with long hairs. *Fruit* of 3, berried, indehiscent, many-seeded carpels. *Seeds* imbedded in pulp.

1. **P. Brunoniana,** *Decaisne in Archiv. Mus.* i. 190, t. 12 A; leaflets ovate or ovate-lanceolate acuminate rarely obtuse. *H. f. & T. Fl. Ind.* 214. Stauntonia Brunoniana, *Wall. Cat.* 4592.

ASSAM and KHASIA HILLS, alt. 3–4000 ft., *Wallich*, &c.

Bark of old branches pale-corky, of young smooth. *Petioles* 3–5 in. *Leaflets* 3–5 by 1–2½ in., base subacute or rounded, shining above, glaucous below; petiole of mid-leaflet 1 in., of lateral ½ in. *Peduncles* 2–4 in., fascicled on scaly tubercles, rigid, slender; pedicels spreading; bracteoles basal, minute, linear. *Flowers* greenish-white; male ⅓, female ⅔ in. long. *Carpels* ½ in., obtuse at both ends, granulate.—Assam specimens have more membranous and obtuse leaves, less glaucous beneath.

3. **HOLBŒLLIA,** Wall.

A climbing shrub. *Leaves* digitate. *Flowers* monœcious, in axillary fascicles or racemes. *Sepals* 6, 2-seriate; 3 outer valvate. *Petals* 6, minute, orbicular. MALE fl.: *Stamens* 6, free; anthers apiculate. FEM. fl.: *Staminodes* 6, minute. *Ovaries* 3; stigmas oblong; ovules many, covering the walls of the ovary. *Fruit* of 3, berried, many-seeded carpels. *Seeds* imbedded in pulp.

1. **H. latifolia,** *Wall. Tent. Fl. Nep.* 24, t. 16; leaflets ovate or oblong, lanceolate or linear in young plants, acuminate.

HIMALAYA, alt. 4–9000 ft., from Bhotan to Kumaon; KHASIA HILLS alt. 4000 ft.; UPPER ASSAM, at low elevations.

Trunk sometimes 4–6 in. diam., bark corky when old. *Leaves* 3–9-foliolate; leaflets 3–6 by ½–2 in., base rounded or acute, shining above, pale and reticulate beneath; petiole of mid-leaflet its own length, of the lateral shorter. *Peduncles* solitary or fascicled. *Flowers* subcorymbose, purplish-green, sweet-scented; male ½–⅔ in., fem. larger. *Carpels* 2–3 in., sessile or short-stalked, oblong, obtuse at both ends; very variable. The characters of the seed require confirmation.

VAR. 1. *latifolia,* leaflets 3–5 ovate or oblong, seeds straight obovoid.—H. latifolia, *Wall. l.c.*; *Decaisne in Archiv. Mus.* i. 194, t. 12, B; *H. f. & T. Fl. Ind.* 215. H. acuminata, *Lindl. in Journ. Hort. Soc.* ii. 313. Stauntonia latifolia *Wall. Cat.* 4950.

VAR. *angustifolia,* leaflets 7–9 narrow- or linear-lanceolate, seeds curved.—H. angustifolia, *Wall. Tent.*, t. 17; *Decaisne* and *H. f. & T. l.c.* Stauntonia angustifolia, *Wall. Cat.* 4951.

4. **BERBERIS,** Linn.

Shrubs; wood yellow. *Leaves* pinnate or simple and then fascicled in the axils of 3–5-partite spines. *Flowers* yellow, hermaphrodite, fascicled, racemed or solitary. *Sepals* 6, with 2–3 appressed bracts, imbricate in 2 series. *Petals* 6, imbricate in 2 series, usually with 2 basal glands inside. *Stamens* 6, free; anther-cells opening by recurved valves. *Ovary* simple; stigma peltate, sessile or on a short style; ovules few, basal, erect. *Berry* few-seeded.—DISTRIB. Species about 50, natives of N. temperate regions, subtropical Asia, the Andes, and temperate S. America.

SECT. I. **Mahonia.** *Leaves* unequally pinnate; leaflets opposite.

1. **B. nepalensis,** *Spreng. Syst. Veg.* ii. 120; leaflets oblong ovate or lanceolate spinous-toothed palmately 3–5-nerved, racemes dense flowered. *Wall. Cat.* 1480; *H. f. & T. Fl. Ind.* 219. B. miccia, *Ham.; Don Prodr.* 205. B. acanthifolia, *Wall.; Don Syst. Gard.* i. 118. Mahonia nepalensis, *DC. Prodr.* i. 109; *Deless. Ic. Sel.* ii. t. 4.

TEMPERATE HIMALAYA, alt. 4–8000 ft.; from Garwhal to Bhotan; KHASIA HILLS alt. 4-5000 ft.; MERGUI, *Griffith;* NILGHIRI Mts, alt. 5–8000 ft.—DISTRIB. Japan?

Stem erect, 3–20 ft., subsimple, leafy near the top only. *Leaves* 6–18 in.; sheath with 2 subulate stipules; leaflets 2–12 pair, 1–5 in., coriaceous, sessile, articulate with the petiole. *Racemes* 3–12 in., erect; bracts 1–2 in., various; bracteoles oblong or ovate. *Flowers* fascicled; pedicels ¼–½ in. slender. *Berry* ⅓–½ in., violet, glaucous, bitter.—Probably *B. Bealii* of Japan is not different.

VAR. 1. *nepalensis* proper; leaflets usually narrow-oblong or ovate-lanceolate, berry elliptic. B. nepalensis *l.c.* Northern and Eastern India.

VAR. 2. *Leschenaultii;* leaflets broader, berry globose. B. Leschenaultii, *Wall. Cat.* 1479; *Wight l.c.* t. 940. Nilghiries.

SECT. II. **Berberis** proper. *Leaves* simple, fascicled in the axils of 3–5-partite (rarely simple) spines (reduced leaves).

* *Flowers racemed, corymbose or subumbelled.*

2. **B. vulgaris,** *L.;* leaves more or less deciduous obovate spinulose-serrate, flowers racemed, petals subentire, stigma sessile discoid. *H. f. & T. Fl. Ind.* 220.

WESTERN HIMALAYA, alt. 8–12,000 ft., from Nipal to Marri, and in WESTERN TIBET.—DISTRIB. Temp. Europe and N. Asia.

An extremely variable plant.

VAR. 1. *vulgaris* proper; 8–10 ft., leaves 2–3 in. quite deciduous long petioled broad oblong-lanceolate or obovate acutely serrate, racemes exceeding the leaves pendulous simple not glaucous, flowers large, berries oblong-ovoid compressed red, seeds 2–5. *DC. Prodr.* i. 105.—Kashmir and Kishtwar, alt. 5–1000 ft.

VAR. 2. *cratægina* (*sp. DC. Prodr.* i. 106); a small bush, leaves 1–2½ in. coriaceous and persistent entire or spinulose, racemes elongate, berries oblong or subspherical. B. emarginata, *Willd.;* sphærocarpa, *Kar. & Kir.;* heterpoda, *Schrenk;* turcomanieæ, *Karel.*—Balti, & Kashmir, alt. 8–10,000 ft.

VAR. 3. *ætnensis* (*sp. Presl. Flor. Sic.* i. 28); low, rigid, robust, leaves 1–1½ in. obovate obtuse or mucronate rarely lanceolate spinulose serrate rarely entire, nerves prominent, racemes suberect or nodding rather exceeding the leaves.—B. Kunawarensis, *Royle Ill.* 64.—Simla to Balti, alt. 6–12,000 ft.

VAR. 4. *brachybotrys* (*sp. Edgew. in Trans. Linn. Soc.* xx. 29); branches robust, often glaucous, leaves ½–1½ in. hardly coriaceous obvate or lanceolate spinulose-serrate or entire, racemes short many-flowered subcorymbose.—From Sikkim to Simla, alt. 6–12,000 ft.

VAR. 5. *cretica* (*sp. Linn.*); low or prostrate, densely branched, leaves ½–1 in. rigid coriaceous angled spinulose-serrate or lobulate, margin thickened, racemes longer or shorter than the leaves.—(B. vulgaris var. australis, *Boiss.* B. Thunbergii, *DC.*) Garwhal to Balti, alt. 9–11,000 ft.

3. **B. umbellata,** *Wall. Cat.* 1475; leaves more or less deciduous obovate sparingly serrulate, flowers subumbellate on a long naked peduncle, berries oblong, stigma flat sessile. *Don Syst. Gard.* i. 116; *H. f. & T. Fl. Ind.* 224. B. aristata, *DC. Prodr.* i. 106; *Hook. Bot. Mag.* t. 2549.

TEMPERATE HIMALAYA, alt. 9–11,000 ft., from Kumaon to Bhotan.

An erect straggling shrub, 8–10 ft.; branches slender, rigid, leafy. *Leaves* 1–2 in., submembranous, green or glaucous beneath. *Flowers* like those of *B. vulgaris.*

4. **B. aristata,** *DC. Syst.* ii. 8; erect, leaves evergreen or nearly so, obovate or oblong entire or with few distant spinous teeth, flowers in compound often corymbose racemes, berries tapering into a short style, stigma small subglobose. *H. f. & T. Fl. Ind.* 224.

TEMPERATE HIMALAYA, alt. 6–10,000 ft.; from Bhotan to Kunawar. NILGHIRI Mts. and CEYLON, alt. 6–7000 ft.

As variable as *B. vulgaris.*

VAR. 1. *aristata*, purple, leaves 1–3 in. broad obovate or oblong elliptic acute or awned entire or spinulose-serrate towards the tip green or glaucous beneath, racemes compound, flowers large, pedicels red. *DC. Prodr.* i. 106; *Royle Ill.* 64; *Wall. Cat.* 1474. B. tinctoria, *Lesch.*; *W. & A. Prodr.* i. 16; *Deless. Ic. Sel.* ii. t. 2; *Wight Ill.* t. 8. B. chitria, *Ham.*; *Don Prodr.* 204; *Bot. Reg.* t. 729. B. angustifolia, *Roxb. Hort. Beng.* 87.—Nipal to Sirmore.

VAR. 2. *floribunda* (*sp. Wall. mss. Cat.* 1474); leaves smaller, flowers on long peduncles, racemes subsimple or subumbellate. B. petiolaris, *Wall. under Cat.* 1474; *Don Syst. Gard.* i. 115. B. affinis *and* ceratophylla, *Don l.c.* B. coriaria, *Royle mss.*: *Lindl. in Bot. Reg. N.S.* xiv. t. 46. B. umbellata, *Lindl. l.c.* 1844 t. 44 (*not of Wall.*).—Kumaon to Kunawar.

VAR. 3. *micrantha*; leafy, leaves 1–3 in. very coriaceous obovate-lanceolate coarsely spinulose-toothed, racemes long nodding, flowers small. *Wall. Cat.* 1474.—Bhotan to Garwhal.

5. **B. Lycium,** *Royle Ill.* 64; *Trans. Linn. Soc.* xvii. 94; bark white, leaves subsessile subpersistent lanceolate or narrow obovate-oblong usually quite entire pale not lacunose glaucous beneath, raceme elongate, berries ovoid, style conspicuous, stigma capitate. *H. f. & T. Fl. Ind.* 225.

WESTERN HIMALAYA, in dry hot places; alt. 3–9000 ft., from Garwhal to Hazara.

An erect rigid shrub, 6–8 ft. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{3}$–$\frac{1}{2}$ in., coriaceous, mucronate, very spinulose, bright green above, venation lax. *Racemes* simple or compound, often corymbose, drooping, longer than the leaves. *Berry* violet.—Very distinct in its ordinary state, but some forms appear to pass into *B. aristata*, and others into *B. asiatica.*

6. **B. asiatica,** *Roxb. in DC. Syst.* ii. 13; bark pale, spines 5-fid small, leaves orbicular or broad obovate subentire or coarsely spinous lacunose white beneath, racemes short corymbose, berries with a distinct style, stigma capitate. *Roxb. Fl. Ind.* ii. 182; *Deless. Ic. Sel.* ii. t. 1; *Wall. Cat.* 1477 (*excl. syn.* tinctoriæ). B. hypoleuca, *Lindl. Journ. Hort. Soc.* ii. 246.

Dry valleys of the HIMALAYA, alt. 3–7500 ft.; from Bhotan to Garwhal. BEHAR, on Parasnath, alt. 3500 ft., *Edgeworth.*—DISTRIB. Affghanistan.

An erect stout branched bush, 3–6 ft. *Leaves* 1–3 in., rarely acute, thickly coriaceous, very strongly reticulate beneath. *Racemes* peduncled or subsessile; flowers rather small, $\frac{1}{14}$–$\frac{1}{3}$ in. diam. *Berry* red or black, glaucous, often large, eatable.

** *Peduncles fascicled*, 1-*flowered.*

7. **B. Wallichiana,** *DC. Prodr.* i. 107; leaves evergreen lanceolate or oblong-lanceolate, flowers many in a fascicle, berry ovoid or oblong. *Wall.*

Plant. As. Rar. iii. t. 243; *Cat.* 1478, *H. f. & T. Fl. Ind.* 225. B. asiatica, *Griff. Ic. Pl. Ind. Or.* iv. t. 1648.

TEMPERATE HIMALAYA in forests, alt. 8–10,000 ft., from Nipal, *Wallich*, to Bhotan, *Griffith;* KHASIA HILLS, alt. 5–6000 ft.

VAR. 1. *atroviridis* (*sp. Wall. mss.*); branches angular, leaves 1½–4 in. lanceolate or narrow obovate, berries black-purple shining. B. Wallichiana, *DC. l.c.*—Nipal to Bhotan.

VAR. 2. *microcarpa;* branches angled or deeply grooved, leaves as in Var. 1, but smaller and sometimes quite entire, berries ¼ in. elliptic-oblong, style short, stigma small.—Khasia hills.

VAR. 3. *latifolia;* leaves 1–2 in. broadly obovate or elliptic-oblong, flowers as in Var. 1.—Skirts of woods, alt. 8–10,000 ft. in Sikkim.

VAR. 4. *pallida;* leaves 2–3 in. narrow lanceolate spinulose pale and glaucous beneath, fascicles few-flowered.—Bhotan, *Griffith.*

8. **B. insignis,** *H. f. & T. Fl. Ind.* 226; erect, spines very few, leaves evergreen large solitary or geminate elliptic or linear-lanceolate shining on both surfaces spinous toothed, pedicels short thick, berries ovoid, stigma sessile.

Humid forests of the EASTERN HIMALAYA, alt. 7–10,000 ft.; from E. Nipal, *H. f.*, to Bhotan, *Griffith.*

A beautiful holly-like bush, 4–6 ft. *Leaves* 3–7 in., rather remote; petiole short. *Flowers* 3–20 in a fascicle, golden-yellow; pedicels ½–1 in., curved. *Petals* 2-fid. *Berries* ⅓ in., black.

9. **B. ulicina,** *H. f. & T. Fl. Ind.* 227; glaucous, robust, densely spiny, leaves fascicled pungent margins thickened, pedicels very short, berries small, stigma sessile.

WESTERN TIBET; stony dry places in Nubra, alt. 14–16,000 ft., *T. T.*

A small shrub, 1–2 ft.; branches short, stout; spines stout, rigid, base dilated. *Leaves* ½ in., rigidly coriaceous, crowded, 1–2-toothed on each side. *Flowers* ⅓ in. diam., orange-yellow, densely crowded. *Petals* 2-fid. *Ovary* obscurely glandular, 4-ovuled. *Berry* black, glaucous.

*** *Peduncles solitary (rarely 2–3), 1-flowered.*

10. **B. angulosa,** *Wall. Cat.* 1475 *in part;* young shoots puberulous, leaves small obovate or obovate-lanceolate puberulous, margins thickened, peduncle exceeding the leaves stout curved, outer sepals equalling the inner, berries broad pendulous.

TEMPERATE HIMALAYA, Nipal, *Wallich;* Sikkim, alt 11–13,000 ft., *H. f.*

A shrub, 4 ft.; branches strict leafy; spines 3–5-fid. *Leaves* 1–1½ in., fascicled, thin, coriaceous, usually quite entire, opaque above, rather shining beneath; nerves subparallel. *Flowers* rather large. *Outer sepals* broad. *Petals* entire. *Berries* ⅓–½ in., globose or broad-oblong, red, 5–7-seeded, edible; stigma sessile or style short; peduncle stout, curved.

11. **B. macrosepala,** *H. f. in Bot. Mag.* t. 4744; erect or prostrate, glabrous, leaves obovate-oblong coarsely spinulose-toothed, margins thickened, peduncle slender, outer sepals equalling the inner, berries large ovoid. *H. f. & T. Fl. Ind.* 228.

Interior of the SIKKIM HIMALAYA, alt. 12–13,000 ft., *H. f.*

A small shrub, 2–4 ft.; branches spreading; spines slender equalling the leaves. *Leaves* fascicled, ½–1 in., usually glaucous beneath. *Flowers* rather large, peduncle curved, glabrous. *Berries* ½–¾ in., red, 6–10-seeded; stigma sessile.

12. **B. concinna,** *H. f. in Bot. Mag.* t. 4744; prostrate, much branched, branches slender red glabrous, leaves small obovate spinous-toothed white

beneath margin thickened, peduncles slender, outer sepals half as long as the inner, berries large oblong. *H. f. & T. Fl. Ind.* 229.

Interior valleys of Sikkim; Himalaya, alt. 12–13,000 ft. *H. f.*

A small shrub, 1–3 ft., often forming appressed cushions, conspicuous for the deep green upper and white under surface of its small deciduous leaves; spines equalling the leaves or shorter, 3-fid, slender. *Leaves* ½–¾ in., tip rounded or truncate. *Peduncle* exceeding the leaves. *Flowers* bright-orange. *Berries* ⅓–¾ in., pendulous, compressed, many-seeded.

Doubtful species are (1) a shrub like *B. concinna* and referred to it as var. β in Fl. Ind., with angled and lobed spinous toothed leaves, found at 9–10,000 ft. in Kumaon and Garwhal. (2) A Sikkim (alt. 9000 ft.) species allied to the above, in flower and young leaf only, with obovate-lanceolate entire awned leaves, and fascicled or subumbelled flowers on a slender peduncle.

5. **EPIMEDIUM,** Linn.

Herbs; rootstock creeping. *Leaves* ternately compound. *Flowers* white or coloured, racemed or panicled. *Sepals* 8, petaloid, in 2 opposite series, outer smaller. *Petals* 4, opposite the sepals, hooded or spurred. *Stamens* 4, opposite the petals; anther-cells opening by recurved valves. *Ovary* 1; style subulate, continuous with the dorsal suture, stigma dilated; ovules few or many, 2-seriate on the ventral suture. *Capsule* elongate, unequally 2-valved, smaller valve deciduous, leaving the seeds attached to the persistent larger. *Seeds* few, aril fleshy.—Distrib. Specie sabout 8; temp. Europe and Asia.

E. elatum, *Morr. & Dne. in Ann. Sc. Nat. Sér.* 2, ii. 356; leaves 2–3-ternate, leaflets ovate-cordate, sepals ovate-lanceolate acute, filaments equalling the ovary, ovules 2–3. *Dne. in Jacq. Voy. Bot.* 9, t. 8; *H. f. & T. Fl. Ind.* 231.

Western Himalaya, Kashmir, Banahal and Kishtwar, alt. 6–8000 ft., *Jacquemont*, &c.

Stem 2–3 ft., slender, glabrous. *Leaves* 6–12 in.; leaflets 1–2½ in., lateral oblique, membranous, spinulous-toothed. *Panicle* glabrous or glandular; bracts minute. *Flowers* ¼ in. diam., yellow-white. *Anthers* linear. *Ovary* linear; style slender persistent. *Capsule* membranous. *Seeds* 2–3, reniform, black.

6. **PODOPHYLLUM,** Linn.

Scapigerous herbs; rootstock creeping, scaly, 2-leaved. *Leaves* peltate, palmately lobed. *Flowers* large, white or rose-coloured. *Sepals* 3–6, petaloid. *Petals* 6–9 (rarely 4). *Stamens* as many or twice as many as the petals; anther-cells opening by slits. *Ovary* simple; stigma large, sessile, peltate; ovules many, on a broad ventral placenta. *Fruit* berried, many-seeded. *Seeds* obovoid, imbedded in pulp.—Distrib. A N. American and a Himalayan species.

1. **P. emodi,** *Wall. Cat.* 814; scape supra-axillary, stamens usually 6. *Royle. Ill.* 64 *and* 379 *in note*; *H. f. & T. Fl. Ind.* 232. P. hexandrum, *Royle l.c.*; *Dne. in Jacq. Voy. Bot.* ii. t. 9.

Interior ranges of the Himalaya, alt. 9–14,000 ft., from Sikkim to Hazara, descending to 6000 ft. in Kashmir.

Stem or scape 6–12 in., erect, stout, herbaceous. *Leaves* 2, vernal, alternate, long-petioled, plaited and deflexed in venation, 6–10 in. diam., orbicular, 3–5-lobed to the middle or base; lobes cuneate, acutely serrate. *Peduncle* terminal in bud, then apparently supra-axillary or inserted on the petiole of the upper leaf. *Flowers* 1–1½ in. diam. *Sepals* very deciduous. *Petals* 6, sometimes 4 (*Royle*), obovate-oblong. *Berry* 1–2 in., ellipsoid, red, edible.

ORDER VII. **NYMPHÆACEÆ.** (By Hooker f. & Thomson.)

Aquatic perennial herbs. *Leaves* usually floating, often peltate, margins involute in vernation. *Scapes* 1-flowered, naked. *Floral-whorls* all free, hypogynous or adnate to a fleshy disk that surrounds or envelops the carpels. *Sepals* 3–5. *Petals* 3–5, or many. *Stamens* many. *Carpels* 3 or more in one whorl, free or connate or irregularly sunk in pits of the disk; stigmas as many as carpels, peltate or decurrent; ovules few, or many and scattered over the walls of the cells, anatropous or orthotropous. *Fruit* formed of the connate carpels, or of separate and indehiscent carpels, or of the enlarged turbinate flat-topped disk with the nut-like carpels sunk in its crown. *Seeds* naked or arilled; albumen floury or 0; embryo enclosed in the enlarged amniotic sac.—DISTRIB. Temperate and tropical; genera 8, species 30–40.

SUBORDER I. **Cabombeæ.** *Sepals* and *petals* 3 each, free. *Carpels* free. *Ovules* few. *Seeds* albuminous..

1. BRASENIA.

SUBORDER II. **Nymphæeæ.** *Sepals* 4–6. *Petals* and *stamens* indefinite. *Carpels* confluent with one another or with the disk into one ovary. *Ovules* many. *Seeds* albuminous.

Sepals, petals and stamens ½-superior, inserted on the disk, which is confluent with the carpels . . . . 2. NYMPHÆA.
Sepals inferior; petals superior; carpels sunk in the torus . . . . 3. BARCLAYA.
Sepals, petals and stamens superior. Carpels sunk in the torus . . 4. EURYALE.

SUBORDER III. **Nelumbieæ.** *Sepals* 4–5. *Petals* and *stamens* indefinite. *Carpels* irregularly scattered, sunk in pits of the turbinate disk. *Ovules* 1–2. *Seed* exalbuminous.

5. NELUMBIUM.

1. **BRASENIA,** Schreber.

A slender aquatic, with a creeping rootstock. *Stem* branched. *Leaves* alternate, peltate, floating; petioles and peduncles clothed with mucus. *Flower* red, peduncles axillary. *Sepals* 3. *Petals* 3, linear. *Stamens* 12–18; anthers linear, slits lateral. *Disk* small. *Ovaries* 6–18, cylindric; stigma dilated, villous; ovules 2–3, pendulous from the walls of the ovary. *Carpels* coriaceous, indehiscent. *Seeds* albuminous.

1. **B. peltata,** *Pursh.*; leaves elliptic-oblong, peduncles pubescent. *H. f. & T. Fl. Ind.* i. 246. Hydropeltis purpurea, *Richard; DC. Prodr.* 112; *Griff. Itin. Notes,* 160.

BHOTAN near Punaka, alt. 6000 ft., *Griffith;* KHASIA HILLS near Nonkreem, alt. 4500 ft., *H. f. & T.*—DISTRIB. Eastern N. America; Eastern Australia.

Leaves 2–4 in. *Flowers* 1 in. diam. *Sepals* pubescent. *Petals* rose-red.

2. **NYMPHÆA,** L.

Large herbs; rootstock creeping. *Flowers* expanded, large, floating, on long radical scapes. *Sepals* 4, adnate to the base of the disk. *Petals* in many series, inner successively transformed into stamens, all adnate to the disk. *Filaments* petaloid; anthers small, linear, slits introrse. *Ovaries* many, in 1 series, sunk in the fleshy disk and with it forming a many-celled ovary crowned by the connate radiating furrowed stigmas; ovules many, anatropous. *Fruit* a spongy berry ripening under water. *Seeds* minute, buried in pulp, enclosed in a sac-like fleshy aril.—DISTRIB. Species 20; most temperate and tropical regions.

1. **N. alba,** *Linn.;* leaves cordate quite entire, flowers white, anthers without appendages, stigmatic rays about 16 with cylindric appendages. *H. f. & T. Fl. Ind.* 241.

KASHMIR LAKE, alt. 5300 ft.—DISTRIB. Europe, Siberia.

Leaves 5–10 in. diam., suborbiculate, lobes contiguous. *Sepals* linear or ovate-oblong, nerves reticulate. *Petals* about 10, outer linear-oblong, equalling the sepals. *Pollen* echinulate. *Seeds* minute, striate and punctate.

VAR. *Kashmiriana, H. f. & T. l.c.;* ovaries pubescent or villous. N. Cachemeriana, *Cambess. in Jacq. Voy. Bot.* ii. t. 10; N. alba, var. Kosteletzkyi, *Planch. in Ann. Sc. Nat. Sér.* 3, xix. 33.—Kashmir, *Jacquemont.*

2. **N. Lotus,** *Linn.;* leaves sharply sinuate-toothed, flowers white rose or red, sepals obtuse ribbed, anthers without appendages, stigmatic rays with clubbed appendages. *H. f. & T. Fl. Ind.* 241. N. rubra, *Roxb. Fl. Ind.* ii. 576; *W. & A. Prodr.* 17; *Wight Ill.* i. t. 10; *Wall. Cat.* 7255. N. Devoniensis, *Hook. Bot. Mag.* t. 4665. N. edulis, *DC.; Roxb. Fl. Ind.* ii. 578; *Wall. Cat.* 7254.

Common throughout the warmer parts of India.—DISTRIB. Africa, Hungary, Java, Philippine Islands.

Leaves 6–12 in. broad; young sagittate. *Flowers* 2–10 in. broad, very variable in colour. *Sepals* oblong, 5–10-ribbed. *Petals* linear or ovate-oblong. *Filaments* broadly dilated at the base; pollen smooth. *Seeds* broadly ellipsoid, rough.

VAR. *pubescens,* H. f. & T. Fl. Ind. 241; leaves puberulous or pubescent beneath, flowers smaller. N. pubescens, *Willd.; W. & A. Prodr.* 17 & 447; *Wall. Cat.* 7256; N. sagittata, *Edgew. in Trans. Linn. Soc.* xx. 29.

3. **N. stellata,** *Willd.;* leaves quite entire or obtusely sinuate-toothed, flowers variously coloured, petals acute or taper-pointed, anthers with long appendages, stigmatic rays terminating in short horns without appendages. *H. f. & T. Fl. Ind.* i. 243.

Common throughout the warmer parts of India.—DISTRIB. Africa.

Leaves orbicular or elliptic, often blotched with purple beneath, lobes acute or obtuse. *Flowers* 1–10 in. diam., blue, white, rose, or purple, slightly odorous. *Sepals* many-veined, not ribbed, often streaked with fine short purple lines. *Petals* 10–30, linear-oblong or lanceolate. *Stamens* 10–50; pollen smooth. *Stigmatic rays* 10–30. *Seeds* substriate.

VAR. 1. *cyanea, H. f. & T. l.c;* flowers medium-sized blue scarcely odorous.—N. cyanea, *Roxb. Fl. Ind.* iii. 577; *W. & A. Prodr.* i. 17; *Wall. Cat.* 7253 *A, D.* N. stellata β, *Bot. Mag.* t. 2058.

VAR. 2. *parviflora, H. f. & T. l.c.;* flowers usually smaller blue.—N. stellata, *Willd; W. & A. Prodr.* i. 17; *Wall. Cat.* 7253, *C. & E.*

VAR. 3. *versicolor, H. f. & T. l.c.;* flowers larger white blue purple or flesh-coloured, stamens very many.—N. versicolor, *Roxb. Hort. Beng.* 41; *Fl. Ind.* ii. 577; *Bot. Mag.* t. 1189; *Wall. Cat.* 7257. N. punctata, *Edgew. in Trans. Linn. Soc.* xx. 29; N. Edgeworthii, and N. Hookeriana, *Lehm. der Gatt. Nymph.* 7 and 21.

4. **N. pygmæa,** *Aiton;* very small, leaves oblong-orbicular or quite entire, lobes acute, flowers white, stamens without appendages, stigmatic rays 4–8 broad ovate spoon-shaped. *Bot. Mag.* t. 1525; *H. f. & T. Fl. Ind.* 244.

KHASIA HILLS, *Jenkins*, in marshes at Nonkreem, alt. 5600 ft., *H. f. & T.*—DISTRIB. Siberia, N. China.

Rootstock woolly with soft black hairs. *Leaves* 1–2 in. long, lobes diverging. *Flowers* 1½–2 in. diam. *Calyx* base square; sepals 4, obtuse. *Petals* about 10, obtuse. *Stamens* 3–4-seriate; pollen subgranular.

3. **BARCLAYA,** Wallich.

An aquatic herb; rootstock short, villous. *Leaves* linear-oblong, hastate, floating. *Peduncles* extra-axillary. *Flowers* red or purplish. *Sepals* 5, inserted at the base of the ovary. *Petals* numerous, 3-seriate, united into a tube that is confluent with the carpels. *Stamens* many-seriate, inserted on a ring within the corolla-tube; anthers pendulous from recurved filaments, outer imperfect. *Ovaries* about 10, confluent, top conical; styles conniving into a 10-rayed cone, stigmatiferous within; ovules many, orthotropous, parietally scattered. *Berry* globose, pulpy, crowned with the corolla-tube and annular torus. *Seeds* spheric, echinate, albumen floury; embryo minute.

1. **B. longifolia,** *Wall. in Trans. Linn. Soc.* xv. 442, t. 18; *Hook. Ic. Pl.* t. 809, 810: *Griff. Notul.* 218, t. 57; *H. f. & T. Fl. Ind.* 246.

BIRMA and from PEGU to MERGUI.

Leaves 6–8 by 1–1½ in., membranous, smooth or pubescent beneath; petiole as long, slender. *Flowers* ½–1½ in. long, dull green outside, red or purple within, inodorous. *Fruit* as large as a cherry.

4. **EURYALE,** Salisb.

A densely prickly aquatic; rootstock thick. *Leaves* orbicular, corrugate. *Flowers* violet, partially submerged. *Sepals* 4, erect, inserted on the edge of the torus above the carpels. *Petals* numerous, 3–5-seriate, shorter than the petals. *Stamens* many, many-seriate, fascicled in eights; filaments linear; pollen spheric, 3-nucleate. *Ovary* 8-celled, sunk in the dilated top of the torus; stigma discoid, depressed, concave; ovules few, parietal. *Berry* spongy, crowned with the persistent sepals. *Seeds* 8–20, aril pulpy; testa thick, black, albumen mealy, embryo small.

1. **E. ferox,** *Salisb.; Roxb. Cor. Plant.* iii. t. 244; *Bot. Mag.* t. 1447; *H. f. & T. Fl. Ind.* 245. E. indica *and* E. ferox, *Planch. Etudes Nymph.* 29. Anneslia spinosa, *Roxb. Fl. Ind.* ii. 573.

OUDE; JHEELS of EASTERN BENGAL, and KASHMIR LAKE.—DISTRIB. China.

Rootstock short. *Leaves* 1–4 ft. diam., elliptic or orbicular, green above, downy and red or purple beneath, with strong spiny ribs. *Flowers* 1–2 in. long, bright red inside, green and shining outside. *Berry* 2–4 in. diam. *Seeds* from a pea to a cherry in size, much eaten roasted.

5. **NELUMBIUM,** Juss.

An erect large, water herb with milky juice; rootstock stout, creeping. *Leaves* raised high above the water, peltate. *Flowers* rose-red white or yellow. *Sepals* 4–5, inserted on the top of the scape, caducous. *Petals* and stamens many, hypogynous, many-seriate, caducous. *Anthers* with a clubbed appendage. *Ovaries* many, 1-celled, sunk in the flat top of an obconic fleshy torus, attachment lateral; style very short, exserted, stigma terminal, dilated; ovules 1–2, pendulous. *Carpels* ovoid, loose in the cavities of the enlarged spongy torus; pericarp bony, smooth. *Seed* filling the carpel, testa spongy, albumen 0; cotyledons fleshy, thick, enclosing the large folded plumule.—DISTRIB. Species 2, one Asiatic and Australian; the other W. Indian.

1. **N. speciosum,** *Willd.; Wight & Arn. Prodr.* i. 16; *Roxb. Fl. Ind.* 647; *Wight Ill.* i. t. 9; *H. f. & T. Fl. Ind.* 247. N. asiaticum, *Rich. in Ann. Mus.* xvii. 249, t. 9. Nelumbo Indica, *Poir. Encycl.* iv. 453. Cyamus Nelumbo, *Smith Exot. Bot.* i. 59, t. 31, 32. C. mysticus, *Salisb. Ann. Bot.* ii. 75. Nymphæa Nelumbo, *Linn.*

Throughout India, extending as far to the N. W. as KASHMIR.—DISTRIB. Persia, Malay Islands, China, Japan, Tropical Australia.

Peduncles and *petioles* 3–6 ft. high, full of spiral vessels, smooth or with small scattered prickles. *Leaves* 2–3 ft. diam., membranous, glaucous, cupped. *Flowers* 4–10 in. diam., white or rose. *Petals* elliptic, concave, veined. *Fruiting torus* 2–4 in. diam. *Ripe carpels* from the size of a pea to a small cherry.

ORDER VIII. **PAPAVERACEÆ.** (By Hooker f. & Thomson.)

Annual or perennial herbs; juice usually milky or coloured. *Leaves* radical or alternate, stipules 0. *Flowers* often large, nodding in bud, regular, hermaphrodite; perianth and stamens very caducous. *Sepals* 2, hypogynous, concave. *Petals* 4, 2-seriate, large, crumpled. *Stamens* very many, filaments slender; anthers erect, slits lateral. *Ovary* 1-celled, or 2–4-celled by the produced placentas; style short or 0; stigmas radiating, connate and opposite the placentas, or free and alternating with them; ovules many-seriate, parietal, anatropous. *Carpels* dehiscing by pores or valves. *Seeds* many, small, albumen oily and fleshy; embryo minute, 2-lobed or 2-fid. —DISTRIB. About 17 genera and 65 species, chiefly natives of the N. Temp. Zone.

The European genera *Glaucium* and *Rœmeria*, both natives of Affghanistan, have not been found in the British possessions.

* Capsule usually short, opening by short valves or pores.

Stigmas 4 or more, radiating on a sessile disk	1. PAPAVER.
Stigmas 4–6, radiating from the top of a depressed style . . .	1.* ARGEMONE.
Stigmas 4–6, decurrent on the top of the style.	2. MECONOPSIS.

** Capsule short or long, dehiscing throughout its length.

Ovary 1-celled; stigma sessile, 4–6-lobed	3. CATHCARTIA.
Ovary 1-celled; style erect, stigma 2–4-lobed	4. STYLOPHORUM.

1. **PAPAVER,** Linn.

Annual or perennial herbs, juice milky. *Leaves* lobed or cut. *Flowers* on long peduncles. *Ovary* 1-celled; stigma discoid or pyramidal with radiating lobes opposite the placentas which project into the cell. *Capsule* short, opening by small valves under the lobes of the persistent stigma. *Seeds* small, pitted.—DISTRIB. Species about 12, temp. Europe and Asia, with an Australian and a S. African representative.

1. **P. nudicaule,** *L.*; perennial, hairy, flowers orange-yellow, capsule obovoid hispid. *H. f. & T. Fl. Ind.* 249.

WESTERN TIBET, alt. 16–17,000 ft., *T. T.*, &c. — DISTRIB. Affghanistan, Mts. of Central and Northern Europe, N. Asia, Arctic regions.

Rootstock scaly. *Leaves* 2–4 in., all radical, obovate or oblong, pinnatifid; lobes linear-oblong, hairy. *Scapes* several, 4–12 in. *Flowers* 2–3 in. diam. *Sepals* densely hairy.

2. **P. hybridum,** *L.*; leaves 2–3-pinnatifid sparingly hispid, filaments dilated upwards, capsule subglobose hispid, stigma convex rays 4–8.

PUNJAB near Peshawur, *Vicary;* JELAM valley, *Jacquemont.*—DISTRIB. Affghanistan, W. Asia, N. Africa, Europe.

Annual, sparingly branched, 10–18 in. *Leaves* more or less cut into linear awned segments; radical petioled, cauline sessile. *Flower* 1–2 in. diam., scarlet, with a black disk. *Sepals* hairy, obtuse. *Capsule* ½ in. long. *Stigmatic rays* reaching or exceeding the edge of the disk.

3. **P. Rhœas,** *L.*; leaves 1–2-pinnatifid, filaments filiform, capsule subglobose glabrous, stigma convex rays 8-12.

KASHMIR, *Falconer*, &c.—Europe, W. Asia, N. Africa.

Annual, branched, hispid, 1–2 ft. *Leaf-lobes* more or less cut, ascending, awned. *Scapes* with spreading or appressed hairs. *Flowers* 3–4 in. diam., scarlet; pairs of petals unequal. *Stigmatic rays* overlapping. *Capsule* stalked.

4. **P. dubium,** *L.*; leaves 1–2-pinnatifid, filaments filiform, capsule obovoid glabrous, stigma 6–12-rayed. *H. f. & T. Fl. Ind.* 250. P. glabrum, *Royle Ill.* 67.

WESTERN HIMALAYA from Garwhal to Hazara, in cornfields.—DISTRIB. Affghanistan, Europe, W. Asia.

Habit of *P. Rhœas*, but often glabrous, and leaf segments usually narrower; hairs of scape appressed. *Petals* scarlet, in unequal pairs. *Capsule* sessile.

P. SOMNIFERUM, *L.*; leaves oblong amplexicaul lobed toothed and serrate, filaments slightly dilated, capsule globose glabrous, stigmatic rays 5–12. *Roxb. Fl. Ind.* ii. 571; *W. & A. Prodr.* 17; *Wall. Cat.* 8118; *H. f. & T. Fl. Ind.* 250. P. amænum, *Lindl. in Bot. Reg.* xxv. *Misc.* 56.

Cultivated throughout India.—DISTRIB. Cultivated in temp. and warm regions of Europe, Asia and N. Africa.

Annual, 2–4 ft., glaucous, simple, rarely branched, usually quite glabrous. *Leaves* ovate-oblong or linear-oblong. *Flower* large, white purple or scarlet. *Sepals* glabrous. *Capsule* 1 in. diam., stalked. *Seeds* white or black.—*Opium poppy.*

P. orientale, L., and *P. Argemone*, L., are common garden plants in India.

1* **ARGEMONE,** Linn.

An erect prickly annual; juice yellow. *Flowers* bright-yellow. *Sepals* 2–3. *Petals* 4–6. *Stamens* indefinite. *Ovary* 1-celled; style very short, stigma 4–7-lobed; ovules many, on 4–7 parietal placentas. *Capsule* short, dehiscing at the top by short valves, that alternate with the stigmas and placentas. *Seeds* many.—DISTRIB. A small American genus, of which the following species is naturalized throughout India.

A. MEXICANA, *L.*; leaves sessile ½-amplexicaul sinuate-pinnatifid variegated green and white. *Roxb. Fl. Ind.* ii. 571; *W. & A. Prod.* i. 18; *Wight Ill.* t. 11; *Wall. Cat.* 8126: *H. f. & T. Fl. Ind.* 251.

By roadsides and in fields throughout India.
A robust herb, sometimes half-woody below, 2–4 ft., with spreading branches. *Leaves* 3–7 in. *Flowers* 1–3 in. diam. *Sepals* horned at the top. *Capsule* ¾–1½ in. long, terete, usually bristly, elliptic or oblong.

2. MECONOPSIS, Viguier.

Perennial herbs; juice yellow. *Leaves* entire or lobed. *Flowers* solitary or racemed, large, blue yellow or purple. *Sepals* 2. *Petals* 4. *Ovary* 1-celled; style distinct, stigmatic lobes radiating on its clubbed extremity. *Capsule* ovoid or elongate, with short valves below the persistent style. *Seeds* many, small, rugose.—Distrib. Mountains of the N. hemisphere; species about 10.

* *Scapes radical, 1-flowered.*

1. **M. simplicifolia,** *H. f. & T. Fl. Ind.* 252; softly hairy, leaves lanceolate entire or few-toothed. *Hook. f. Ill. Him. Pl.* t. 8. Papaver simplicifolium, *Don Prodr.* 196; *Wall. Cat.* 8125.

Subalpine Himalaya, Nipal, *Wallich;* Sikkim, alt. 12–14,000 ft., *H. f.*
Root stout, fusiform; neck villous. *Leaves* many, 2–3 in., tapering into a petiole. *Scapes* stout, clothed with deflexed hairs. *Flowers* 2–3 in. diam., blue-purple. *Sepals* hispid. *Ovary* cylindric; style ¼ in., stigmas 5–8. *Capsule* 2 in., linear-oblong, covered with deciduous hairs.

2. **M. horridula,** *H. f. & T. Fl. Ind.* 252; prickly, leaves lanceolate subentire.

Sikkim-Himalaya, alt. 14–17,000 ft., *H. f.*
Stem 0, or short. *Leaves* 3–5 in., obtuse or acute. *Scapes* 4–8 in., many, rigid, erect, densely prickly. *Flowers* 1½ in. diam., blue-purple. *Sepals* bristly. *Capsule* ½–1 in., prickly, obovate or oblong; style ¼ in., stigma conical.—Possibly a state of *M. aculeata.* In abnormal flowers the petals are sometimes many and linear.

** *Stems leafy. Flowers racemed or panicled.*

3. **M. aculeata,** *Royle Ill.* 67, t. 15; prickly, leaves irregularly pinnatifid, flowers blue-purple, capsules short prickly and bristly. *Wall. Cat.* 8122; *H. f. & T. Fl. Ind.* 253; *Hook. Bot. Mag.* t. 5456. M. Gul. Waldemani, *Klotzsch Reis. Pr. Wald.* t. 36.

Western Himalaya, from Kashmir to Kumaon; alt. 11–15,000 ft.
Stem 1–2 ft., smooth, except the short scattered prickles. *Leaves* 4–8 in., oblong or lanceolate, long-petioled; cauline sessile. *Flowers* 2–3 in. diam.; pedicels slender, prickly in fruit. *Capsule* ½–⅔ in., densely prickly, obconic-obovate or oblong; style half as long.

4. **M. robusta,** *H. f. & T. Fl. Ind.* 253; glaucous, sparsely hairy, leaves pinnatifid, capsule linear-oblong 7–8-valved clothed with spreading bristles. *Wall. Cat.* 8121, 8124.

Temperate Himalaya, alt. 8–10,000 ft.; from Nipal, *Wallich,* to Kumaon.
Stem 4–6 ft. *Leaves* 8–14 in., pinnate, lobes pinnatifid, long-petioled, cauline sessile. *Flowers* 2–3 in. diam., colour unknown, in subracemose panicles; pedicels 3–4 in., densely clothed with reflexed bristles under the flower, elongating in fruit. *Sepals* bristly. *Capsule* 1½ in., densely bristly, at length glabrous; style slender.

5. **M. nipalensis,** *DC. Prodr.* i. 121; stellately pubescent and laxly hairy, leaves sinuate-lobed or pinnatifid, flowers golden yellow, sepals

setose, capsule obovate-oblong 8–10-valved. *Wall. Cat.* 8123 *A*; *H. f. & T. Fl. Ind.* 253; *H. f. Ill. Him. Pl.* t. 9. Papaver paniculatum, *Don Prodr.* 197.

TEMPERATE HIMALAYA, alt. 10–12,000 ft.; Nipal, *Wallich*, Sikkim, *H. f.*

Stem 3–5 ft., stout, erect, nearly simple; young parts clothed with soft golden villous hairs. *Leaves* 10–16 in., oblong or lanceolate, softly pubescent when young. *Flowers* 2–3½ in. diam., in elongated nearly simple racemes. *Sepals* densely tomentose and bristly. *Capsule* 1½–2 in., clothed with appressed hairs and stellate down; style ½ in.

6. **M. Wallichii,** *Hook. Bot. Mag.* t. 4668; slender, stellately pubescent and softly hairy, leaves pinnatifid, flowers much panicled purple, sepals not setose, capsule elliptic-oblong 5-valved. *Wall. Cat.* 8123 *B*; *H. f. & T. Fl. Ind.* 254.

TEMPERATE HIMALAYA, alt. 9–10,000 ft.; in Nipal, *Wallich*, and Sikkim, *H. f.*

Stem 4–6 ft., branched. *Leaves* 8–12 in., oblong or obovate-lanceolate, glaucous beneath; long-petioled. *Flowers* 1½–2 in. diam., many; pedicels short. *Sepals* densely pubescent. *Capsule* 1 in., elliptic-oblong, 5-valved, densely bristly.—There is much confusion in the Wallichian Herbarium amongst the specimens of the three last species (which are included in his numbers 8123, 8124 and 8125), and which we suspect may be reduced to two; and we are further not sure to which Don's *Papaver paniculatum* belongs.

3. **CATHCARTIA,** Hook. f.

A perennial softly hairy herb; juice yellow. *Leaves* long-petioled, cordate, lobed. *Flowers* racemed, golden-yellow. *Sepals* 2. *Petals* 4. *Ovary* 1-celled; stigma sessile, 4–6-lobed; ovules many, on 4–6 parietal placentas. *Capsule* cylindric, dehiscing throughout its length by valves between the placentas which remain attached to the persistent stigma. *Seeds* strophiolate.

1. **C. villosa,** *Hook. f. in Bot. Mag.* t. 4596; *H. f. & T. Fl. Ind.* 254.

SIKKIM HIMALAYA, alt. 10–12,000 ft., *H. f.*

Stem 10–18 in., sparingly branched. *Leaves* 1–3 in. diam., long-petioled; 3–5-lobed, lobes variously cut; cauline shorter petioled and less divided, uppermost sessile. *Flowers* few, 2–3 in. diam., in few-flowered racemes; pedicels slender, curved. *Capsules* 2–3 in., slender, erect, valves membranous.

4. **STYLOPHORUM,** Nuttal.

Perennial herbs; juice yellow. *Leaves* pinnatifid. *Flowers* yellow or red. *Sepals* 2. *Petals* 4. *Ovary* 1-celled; style erect, stigmas 2–4, ascending, papillose on the inner surface; ovules many, on 2–4 parietal placentas. *Capsule* ovoid-oblong or linear, dehiscing by 2–4 valves between the placentas which remain attached to the persistent stigmas.—DISTRIB. Species 4–5, temperate European and Asiatic.

1. **S. lactucoides,** *Benth. & Hook. f. Gen. Pl.* 53; laxly hairy, leaves runcinate pinnatifid, flowers yellow. Dicranostigma lactucoides, *H. f. & T. Fl. Ind.* 255.

Inner ranges of the GARWHAL HIMALAYA, alt. 11,000 ft., *Strach. & Winterb.*

Rootstock stout, woody. *Stem* 6–10 in. *Leaves* numerous, 3–5 in., glaucous beneath, segments broad ovate, hairy on both surfaces; petiole winged; cauline sessile. *Scapes* 3–4, slender. *Flowers* few, 2 in. diam., pedicels slender. *Sepals* pilose, tips horned.

Order IX. **FUMARIACEÆ.**

Annual or perennial herbs; juice watery. *Leaves* usually divided, segments not jointed. *Flowers* small, racemed, irregular, hermaphrodite. *Sepals* 2, small, scale-like, deciduous. *Petals* 4, in usually very dissimilar pairs; 2 outer larger, one or both gibbous or spurred; 2 inner smaller, erect, tips often coherent. *Stamens* 6, in 2 bundles (4, free in *Hypecoum*), opposite the outer petals; anther of central stamen in each bundle 2-celled, of lateral 1-celled. *Ovary* 1-celled; style long or short, stigma obtuse or lobed; ovules 2 or more, amphitropous, parietal. *Fruit* a 2-valved, many-seeded capsule, or an indehiscent 1-seeded nut. *Seeds* albuminous, raphe sometimes appendaged; embryo minute.—Distrib. Genera 7; species about 100, natives of the temp. and warm regions of the N. hemisphere.

Stamens 4, free	1. Hypecoum.
Stamens 6, diadelphous.	
Outer petals both spurred; capsule many-seeded	2. Dicentra.
One outer petal spurred; capsule many-seeded	3. Corydalis.
One outer petal spurred; fruit indehiscent, nut 1-seeded . . .	4. Fumaria.

1. **HYPECOUM,** Tournefort.

Low annual glaucous herbs. *Leaves* pinnatisect. *Flowers* yellow white or purplish. *Sepals* 2, small. *Petals* 4, spreading, 2 outer flat or slightly concave, obovate, obtuse or obtusely 3-toothed; 2 inner 3-lobed, midlobe concave. *Stamens* 4, free, opposite the petals, with sometimes a stalked gland at the base of each; anthers 2-celled. *Ovary* 1-celled, septate within; style short, stigmas 2, glandular at the tips; ovules many, on 2 parietal placentas. *Capsule* slender, transversely septate within, breaking up into joints or longitudinally 2-valved. *Seeds* compressed.—Distrib. Species 4–5; natives of the Mediterranean region and temperate Asia.

1. **H. procumbens,** *Linn.*; leaves 2–3-pinnatisect, flowers yellow, outer petals 3-lobed, midlobe of inner toothed or fimbriate. *H. f. & T. Fl. Ind.* 275.

Drier parts of the Punjaub; Peshawur, *Vicary*, Mooltan, *Edgeworth*, Salt Range, *Fleming*, &c.—Distrib. W. Asia, Mediterranean region.

Stems many, procumbent, 3–12 in., slender. *Leaves* 2–4 in., segments linear or oblong, cut; upper sessile, whorled. *Flowers* few, $\frac{1}{3}$ in. diam., pedicelled. *Inner petals* with the lateral segments linear-oblong, obtuse, midlobe entire retuse or 2-fid. *Fruit* $1\frac{1}{2}$–$2\frac{1}{2}$ in., $\frac{1}{6}$ in. broad, curved, subcompressed, at length breaking up into 1-seeded joints.

2. **H. leptocarpum,** *H. f. & T. Fl. Ind.* 276; leaves 2-pinnatisect, flowers pale purple, outer petals obtuse, midlobe of inner oblong cucullate.

Sandy soil in West. Tibet, alt. 9–12,000 ft., *T. T.*; interior of the Sikkim Himalaya, alt. 12–14000 ft., *H. f.*

Stems many, procumbent, 6–12 in., much branched. *Leaves* many, 2–4 in., pinnæ $\frac{1}{2}$ in., distant; pinnules oblong, sharply cut; uppermost linear, whorled. *Flowers* $\frac{1}{3}$–$\frac{1}{2}$ in. diam.; pedicels slender. *Inner petals* lobed almost to the middle. *Fruit* $\frac{1}{2}$ in., very slender, breaking up into 1-seeded joints.

2. **DICENTRA,** Borkhaus.

Glabrous, perennial rooted, climbing, slender herbs. *Leaves* decompound, petiole ending in a branched tendril. *Flowers* yellow or purple, in leaf-opposed pendulous racemes or corymbs. *Sepals* 2, small. *Petals* 4, connivent; 2 outer oblong, concave, base saccate; 2 inner clawed, tips cohering, keeled. *Stamens* 6, diadelphous from the base or from above the middle; mid-anther of each bundle 2-celled, lateral 1-celled. *Ovary* 1-celled; style filiform, stigma 2-lobed; ovules many, on 2 parietal placentas. *Capsule* dehiscing by 2 membranous (rarely fleshy) longitudinal valves, which leave the seed-bearing placentas attached to the stigma. *Seeds* small, beaked, arillate or not.—DISTRIB. Several species, natives of temp. N. Asia and N. America.

1. **D. torulosa,** *H. f. & T. Fl. Ind.* 272; peduncles 6–8-flowered corymbose or subumbellate, bracts fimbriate, capsule narrow torulose, seeds opaque.

KHASIA HILLS, alt. 4–6000 ft., *Griffith*, &c.

Stem 8–10 ft.. *Leaf-segments* ¼–1 in., ovate to linear-lanceolate. *Flowers* ½–⅔ in. long, golden-yellow; pedicels ½ in.; bracts as long, membranous, linear. *Filaments* with a short basal spur. *Capsule* 1½–3 in., linear. *Seeds* 1-seriate, granulate; aril 2-lobed.

2. **D. Roylei,** *H. f. & T. Fl. Ind.* 273; peduncles 2–4 flowered, bracts lanceolate, capsule narrow not torulose, seeds shining.

TEMPERATE HIMALAYA, alt. 5–6000 ft., from Bhotan, *Griffith*, to Simla, *Lady Dalhousie*. KHASIA HILLS, *Griffith*, &c.

Similar to *D. torulosa*, but more slender, 2–4 ft. *Flowers* ¾–1 in. long, yellow, sometimes tinged purple; pedicels ½–1 in., longer than the lanceolate membranous bracts. *Capsule* 1–1½ by ⅕ in. *Seeds* 2-seriate, black; aril small.

3. **D. scandens,** *Walp. Rep.* i. 118; peduncles 8–12-flowered, bracts very small, capsule membranous lanceolate, seeds smooth shining. *H. f. & T. Fl. Ind.* 273. Macrocapnos scandens, *Royle*. Dielytra scandens, *Don Prodr.* 198.

TEMPERATE HIMALAYA; alt. 5–6000 ft., from Nipal, *Wallich*, to Garwhal, *Edgeworth*.

Stem slender, flexuous, angled. *Leaves* alternate, segments ¼–1 in., oval oblong or orbicular. *Flowers* ¾–1 in. long, yellow or purple; peduncle 2–3 in., slender, often leafy; pedicels ½–1 in.; bracts linear. *Capsule* 1–1¼ in., acute at both ends, style ¼–⅓ in., valves membranous. *Seeds* finely granulate at the back.

4. **D. thalictrifolia,** *H. f. & T. Fl. Ind.* 273; peduncle 8–12-flowered, bracts very small, capsule fleshy ovate-cordate, seeds granulate Dactylicapnos thalictrifolia, *Wall. Tent.* 51, t. 89; *Cat.* 1426; *Sweet Brit. Fl. Gard. Ser.* 2, t. 127.

TEMPERATE HIMALAYA, alt. 4–8000 ft., from Nipal, *Wallich*; to Bhotan, *Griffith*; KHASIA HILLS at the Kala Pani Bungalow, alt. 5000 ft., *H. f. & T.*

Very similar to *D. scandens* and possibly not distinct specifically, but the capsule is broader, ¾ in. long, thick, fleshy, very tardily dehiscent, the style is stouter, and the seeds finely granulate near the hilum and coarsely so on the back.—It is common in Sikkim, and the pods are drier and most dehiscent at higher elevations.

3. **CORYDALIS,** DC.

Erect or prostrate herbs, usually perennial rooted. *Leaves* lobed or cut, upper sometimes opposite. *Flowers* racemed, rarely subumbellate, small, white blue yellow or purple. *Sepals* 2, small. *Petals* 4, erect, or conniving; 2 outer dissimilar, anterior flat or concave, posterior gibbous or spurred at the base; 2 inner clawed, tips free or cohering, keeled. *Stamens* 6, diadelphous; posterior bundle with a basal spur enclosed in the petal-spur; mid-anther of each bundle 2-celled, lateral 1-celled. *Ovary* 1-celled; style filiform, stigmas 2 minute or dilated; ovules 2 or more, on 2 parietal placentas. *Capsule* ovoid oblong elliptic or linear, valves 2 membranous leaving the seed-bearing placentas attached to the style. *Seeds* small, beaked, aril fleshy or 0.—DISTRIB. Species about 70, temp. European and Asiatic, with a few N. American and Cape species.

SECT. I. Erect leafy branched fibrous-rooted herbs. Capsule narrow linear. Seeds 1-seriate.

1. **C. ophiocarpa,** *H. f. & T. Fl. Ind.* 259; leaves 2-pinnatisect, racemes lax many-flowered terminal and leaf-opposed, posticous petal equalling or exceeding the broad obtuse spur tip flat obcordate, anticous linear concave, capsule tortuous.

Moist valleys of the SIKKIM-HIMALAYA, alt. 9000 ft., *H. f.*

Stem 2–3 ft., slender, branched. *Leaves* 4–8 in., glaucous beneath, pinnæ 1–2 in., pinnules obovate-oblong, segments obtuse, mucronate, glaucous beneath. *Flowers* yellow; bracts minute, subulate, entire. *Sepals* orbicular, fimbriate. *Posticous petal* curved; lateral united below the tip. *Style* slender, equalling the many-ovuled ovary. *Capsule* 1 in. *Seeds* small, black, shining, punctate; funicle thickened.

2. **C. flaccida,** *H. f. & T. Fl. Ind.* 260; tall, leaves 3–4-pinnatisect, racemes terminal and axillary many-flowered, posticous petal twice as long as the curved conical spur, tip spathulate 2-lobed, pod straight.

Moist valleys of the SIKKIM-HIMALAYA, alt. 11–12,000 ft., *H. f.*

Stem 2–3 ft., stout, erect, branched. *Leaves* 6–12 in., membranous; pinnæ 2 in.; pinnules subsessile, ovate or orbicular, obtuse, not glaucous beneath; lobes rounded, apiculate. *Flowers* ½–¾ in. long, brown-purple; racemes 2–6 in.; lower bracts leafy, median cut or lobed, upper narrow. *Sepals* ovate, acute, toothed. *Posticous petal* plano-convex, tip rounded winged. *Style* slender, twice as long as the linear ovary. *Capsule* 1–1½ in., linear.

3. **C. leptocarpa,** *H. f. & T. Fl. Ind.* 260; diffuse, leaves 2-ternately pinnatisect, racemes long-peduncled 2–7 flowered leaf-opposed, posticous petal concave acuminate much shorter than the slender curved spur, pod erect straight torulose.

EASTERN HIMALAYA, in Bhotan, *Griffith;* Sikkim, alt. 8000 ft., *H. f.*

Stem 6–12 in., weak, branched, decumbent. *Leaves* 3–6 in., long-petioled, membranous, segments broadly obovate, deeply cut, lobes rounded, glaucous or not beneath. *Flowers* 1–1¼ in. long, dull purple; bracts obovate or oblong-cuneate, cut. *Sepals* minute, oblong, fimbriate. *Posticous petal* concave, narrow oblong, tip winged; anticous spathulate, acuminate. *Style* slender, half as long as the linear ovary. *Capsule* 1–1½ in., narrow linear. *Seeds* 1-seriate, black, shining, smooth; aril broad, 2-lobed.

SECT. II. Root fibrous. Pod short, elliptic obovate lanceolate or subglobose. Seeds 2-seriate.

*Root bulbous, or rootstock elongate, stem simple. Radical leaves few or 0; cauline opposite alternate or whorled. Racemes undivided.

4. **C. rutæfolia,** *Sibth. Flor. Græc.* t. 667; leaves opposite or whorled 2–3-ternately cut, raceme erect 6–12-flowered, bracts entire, outer petals not keeled equalling or shorter than the inflated obtuse spur. *H. f. & T. Fl. Ind.* 262. C. diphylla, *Wall. Cat.* 1430; *Tent. Fl. Nep.* 54; C. pauciflora, *Edgew. in Trans. Linn. Soc.* xx. 30. C. longipes, *Don Prodr.* 198 (*not of DC.*).

C. Hamiltoniana, *Don Syst. Gard.* i. 142. C. Griffithii, *Boiss. Diagn. Ser.* 2, No. 1, p. 15; *Griffith Ic. Pl. Ind. Or.* t. 658, f. 23.

Western Himalaya, alt. 6–10,000 ft., from Kumaon to Marri, *Fleming.*—Distrib. Mts. of the Levant, W. Asia, and Soongaria.

Rootstock slender. *Stem* 3–8 in., erect, simple. *Leaves* 2–3, subsessile; segments small rounded in much-divided leaves, more commonly ¼–1 in., ovate-oblong or linear, entire or lobed, much veined. *Flowers* ¾–1 in. long, bright purple, tips dark; bracts oblong or lanceolate, veined, shorter than the pedicels. *Sepals* minute. *Style* shorter than the oblong ovary; stigma dilated. *Capsule* ⅓ in., ovate-oblong.

Var. 1; posticous petal dilated upwards very obtuse mucronate or emarginate.

Var. 2; posticous petal narrow concave acute.—C. verticillaris, *DC. Prodr.* i. 126.

5. **C. cachemiriana,** *Royle Ill.* 69, t. 16, f. 1; radical leaves palmately 3–5-partite, cauline usually alternate 3–6-partite, flowers subumbellate, lower bracts 3-fid, posticous petal about equalling the curved spur. *H. f. & T. Fl. Ind.* 263.

Temperate and subalpine Himalaya, alt. 9–12,000 ft., from Sikkim, *H. f.*, to Kashmir, *Royle.*

Bulb small, scaly. *Stem* 2–6 in. *Radical* leaves long-petioled, early withering; cauline near the top of the stem, subsessile; lobes ½–1 in., linear, entire. *Flowers* ½-1 in. long, bright blue with dark-blue tips; racemes terminal, 3–8-flowered; bracts exceeding the pedicels. *Sepals* minute. *Posticous petal* concave, acute or acuminate. *Capsule* linear-oblong, pendulous or deflexed.

6. **C. polygalina,** *H. f. & T. Fl. Ind.* 263; simple, leaves cauline alternate pinnate, racemes axillary and terminal 5–10-flowered, lower bracts 3-fid, posticous petal shorter than the straight obtuse cylindric spur.

Sikkim-Himalaya, alt. 14–16,000 ft., *H. f.*

Root and radical leaves unknown. *Cauline leaves* 1–2 in., subsessile, pinnæ in 5–6 pairs, lower 3–5-partite; segments 1 in., narrow-linear, coriaceous, parallel-veined. *Flowers* ¾ in., yellow with a dark purple spot; pedicels very short; upper bracts lanceolate. *Posticous petal* vaulted, acute, wing narrow. *Capsule* ⅓–½ in., oblong.—Allied to *C. rutæfolia*, but distinguished by the habit, alternate leaves, axillary racemes, and winged tips of the petals.

7. **C. juncea,** *Wall. Tent. Fl. Nip.* 54, t. 42; *Cat.* 1429; erect, slender, leafless or leaves few narrow, racemes terminal many-flowered, bracts linear entire, posticous petals longer than the short obtuse spur. *H. f. & T. Fl. Ind.* 264.

Temperate Himalaya, alt. 12–14,000 ft.; Nipal, *Wallich;* Sikkim, *H. f.*

Stem 1–1½ ft. *Leaves* ½–1 in., linear-lanceolate, bract-like. *Flowers* ⅓–½ in. long, bright yellow with purple tips; racemes 2–3 in.; pedicels ½–⅔ in., slender; bracts half as long. *Posticous petal* very convex, back broadly winged. *Capsules* (unripe) ¼ in., oblong, in much elongate racemes, pedicels deflexed.

** Root fusiform. Stem or scape simple, rarely divided, leafless or with 1-2 leaves. Leaves chiefly radical. Racemes simple. Spur equalling or exceeding the petals.

8. **C. crithmifolia,** *Royle Ill.* 68; leaves all radical 2–3 pinnatisect, segments narrow or broad, raceme terminal many-flowered, bracts narrow much exceeding the pedicels. *H. f. & T. Fl. Ind.* 264; *Walp. Rep.* i. 120 (*as* C. epithymifolia, *by error*).

Subalpine and Temperate Himalaya, ascending to 14,000 ft., from Garwhal, *Munro;* to Kunawur, *Jacquemont*, &c.

Stem 3–12 in., rather stout, leafless. *Leaves* 1–4 in. diam., orbicular, pinnæ long-petioled, segments linear and entire, or broad and cut into narrow lobes; petiole equalling the stem. *Flowers* 1 in. long, pale yellow, tip purple; raceme 1–3 in. long; bracts 1–2 in. *Posticous petal* vaulted, acute, half as long as the slender spur. *Capsules* small, oblong, pedicel recurved.

9. **C. Falconeri,** *H. f. & T.*; erect, radical leaves 2-pinnate cauline 2 opposite, racemes terminal many-flowered lax or dense, bracts linear-lanceolate entire or cut, lowest 3-fid or pinnatifid exceeding the pedicels.

WESTERN TIBET; at Deotsu, *Falconer.*
Rootstock woody, base covered with withered leaf-sheaths. *Stem* 6–15 in., simple. *Radical leaves* few, long-petioled; pinnæ 1–2 pair, shortly petioled; pinnules 3-partite; segments narrow, 3-nerved; cauline leaves above the middle of the stem, sessile or petioled, 2 pinnate, lanceolate, 3-nerved. *Flowers* ½–¾ in. long, yellow?, with purple tips; racemes 1–2 in. *Posticous petal* vaulted, acute, back winged, equalling the cylindric slightly hooked spur. *Capsule* ½ in., oblong, much longer than the persistent style; pedicel deflexed. *Seeds* black, shining.

10. **C. elegans,** *Wall. Cat.* 1435; erect or decumbent, radical leaves pinnate cauline low down on the stem, racemes terminal, 6–14-flowered, bracts large cuneate-oblong acuminate equalling or exceeding the pedicels, flowers very broad. *H. f. & T. Fl. Ind.* 265.

WESTERN HIMALAYA, alt. 13–14,000 ft.; from Kumaon, *Blinkworth,* to Deotsu, *Falconer.*
Rootstock stout, woody. *Stem* 6–12 in., simple, base clothed with withered sheaths. *Radical leaves* 3–4 in., petiole as long; pinnæ 2–5 pair, 1 in. long, subsessile, orbicular, base cuneate, deeply 5–7-lobed, segments obtuse or mucronate. *Flowers* 1 in. long (yellow with purple tips?). *Posticous petals* very convex, broadly ovate, subacute, back wing very broad, equalling the wide conical very obtuse spur. *Capsules* small, oblong; pedicels spreading or deflexed.—A rare and imperfectly known plant; its flowers are very broad.

11. **C. Govaniana,** *Wall. Tent. Fl. Nip.* 55; *Cat.* 1431; stem stout, radical leaves many oblong 2-pinnatisect cauline 1–2 or 0, racemes terminal dense many-flowered, bracts broadly cuneate exceeding the pedicels cut above the middle. *Royle Ill.* t. 16, f. 2; *H. f. & T. Fl. Ind.* 261.

WESTERN HIMALAYA, alt. 8–12,000 ft.; from Kumaon, *Govan*, to Kashmir, *T. T.*
Rootstock woody, often branched, crowned with withered leaf-sheaths. *Stem* 1–2 ft., as thick as the thumb, almost naked or with 1–2 leaves near the top. *Radical leaves* nearly equalling the stem, long-petioled, pinnules cuneate-lanceolate, cut into linear segments, 2 near the base. *Flowers* 1 in. long, bright yellow; racemes 2–4 in. *Posticous petal* very convex, back wing very broad, limb shorter than the curved slender spur. *Capsule* ½–⅔ in.; style persistent, half its length.

12. **C. tibetica,** *H. f. & T. Fl. Ind.* 265; small, decumbent, glabrous or subpilose, glaucous, radical leaves many pinnatisect, cauline 1 or 0, racemes terminal short 4–12-flowered, bracts lanceolate and entire or ovate-oblong and cut.

WESTERN TIBET; alt. 14–17,000 ft., from Gugi, *Strach. & Wint.*, to Balti, *T. T.*
Rootstock prostrate, densely crowned with withered sheaths. *Stem* 2–6 in., weak, tufted, decumbent, rarely forked with a leaf at the fork. *Radical leaves* 3–4 in., oblong; pinnæ ¼–¾ in., orbicular or oval, cut to the base. *Flowers* ¾ in., pale yellow, tips brown or green. *Posticous petal* winged at the back, equalling the straight spur. *Capsule* ⅓ in., narrow oblong, about equalling the persistent style; pedicel deflexed. *Seeds* few, smooth.—Perhaps an alpine slate of *C. Moorcroftiana.*

*** Root fusiform. Stem branched (simple in 13, *Moorcroftiana* and 14, *Gortschakovii*). Racemes often divided. Spur equalling or exceeding the petals. (See also 24, *crassifolia*.)

13. **C. Moorcroftiana,** *Wall. Cat.* 1432; stout, erect, glaucous, more or less glandular, leaves 2–3-pinnatisect, racemes many-flowered simple or branched, bracts linear or lanceolate entire or lobed. *H. f. & T. Fl. Ind.* 266.

Western Tibet; alt. 10–17,000 ft., from Gugi, *Strach. & Wint.*, to Balti, *Moorcroft.*—Distrib. Affghanistan.

Rootstock stout, woody, densely clothed with withered sheaths. *Stem* 6–18 in., naked or leafy, simple or divided. *Leaves* 3–8 in., oblong, pinnæ ovate or orbicular, variously cut and lobed. *Flowers* ¾ in. long, yellow, tips purple. *Posticous petal* obtuse, back broadly keeled, equalling the straight obtuse spur. *Capsule* ½ in., narrow elliptic, acute at both ends; style persistent, half as long. *Seeds* black, shining.

14. **C. Gortschakovii,** *Schrenk. Enum. Plant. Soongar.* 100; stem erect quite glabrous leafy, radical leaves decompound glaucous, pinnules petioled, racemes dense many-flowered terminal and axillary, bracts leafy incised. *Ledeb Fl. Alt.* i. 746; *H. f. & T. Fl. Ind.* 267.

Tibetan Himalaya, from Gugi, *Strach. & Wint.*, to Kashmir, *T. T.*, and Hasora, *Jacquemont*, &c.—Distrib. Soongaria.

Rootstock woody. *Stem* 1–2 ft., simple or branched. *Radical leaves* 6–12 in., leaves long-petioled, ovate, pinnæ and pinnules petioled, segments incised. *Flowers* ⅔–1 in. long, yellow, tips purple. *Posticous petal* equalling the straight obtuse spur, dorsal wing broad or narrow. *Capsule* and *seeds* of *C. Moorcroftiana.*—We have fragments of a plant from Tibet, N. of Nipal, apparently intermediate between this and the last species. The Soongarian specimens of this have simple stems and larger flowers than the Himalayan.

15. **C. ramosa,** *Wall. Cat.* 1434; stem procumbent weak branched, leaves decompound segments linear, racemes terminal many lax many-flowered, bracts cut into linear lobes. *H. f. & T. Fl. Ind.* 267.

Alpine Himalaya, alt. 12–15,000 ft., from Sikkim, *H. f.*, to Kashmir, *T. T.*

Glaucous. *Stem* 1–2 ft. (dwarf at high elevations), often leafy, flexuous. *Radical leaves* few or many, long-petioled, 2–3 times divided, ultimate segments small narrow-oblong or linear. *Flowers* ½ in. long, yellow; racemes 1–5 in. *Posticous petal* dorsally winged, hooded, equalling or shorter than the obtuse spur. *Capsules* obovate-oblong, obtuse; style persistent, pedicels deflexed. *Seeds* shining.

Var. 1. *glauca;* leaves very glaucous, segments very narrow, wing of posticous petal broad subentire.

Var. 2. *vaginans;* leaves membranous less glaucous, segments broader, wing of posticous petal lacerate.

Var. 3. *nana;* dwarf, alpine, leaves subsessile, wing of posticous petal very narrow.

16. **C. sibirica,** *Pers. Synops.* ii. 70; subglaucous, branched, prostrate, leaves 2–3-pinnate, segments 3–5 broad-ovate deeply cut, racemes lax few-flowered terminating long slender branches, bracts small cut into narrow lobes, spur recurved, seeds shining. *H. f. & T. Fl. Ind.* 268. C. Impatiens, *Fisch. in DC. Prodr.* i. 128. C. longipes, *D.C.; Wall. Cat.* 1433; *Tent. Fl. Nip.* t. 42 (*bad, not of Don Prodr.*) C. filiformis, *Royle Ill.* 65.

Himalaya, alt. 7–14,000 ft., from Sikkim to Garwhal; Khasia hills, alt. 6000 ft.—Distrib. Eastern Siberia.

Stem 1–2 ft., weak, much branched, leafy. *Leaves* membranous. *Flowers* yellow, ½ in. long. *Posticous petal* hooded, acute, equalling or exceeding the very broad conic obtuse spur. *Capsule* ¼–½ in., linear, or linear obovate, style very short.—Very variable, and possibly a form of *C. ramosa.* Wallich's figure of *C. longipes* is unlike his specimen or those of any other plant, and is probably made up of several allied species.

17. **C. cornuta,** *Royle Ill.* 69; glaucous, decumbent, branched, leaves 2–3-pinnate, pinnæ cuneate-obovate or oblong, racemes terminal many-flowered dense elongate, bracts small entire or cut, spur straight or tip hooked, seeds opaque. *H. f. & T. Fl. Ind.* 269. C. debilis, *Edgew. in Trans. Linn. Soc.* xx. 30.

TEMPERATE HIMALAYA, alt. 8–10,000 ft., from Kumaon, *Strach. & Wint.*, to Kashmir, *T. T.*

Habit of *C. ramosa* and *sibirica.* *Leaves* long-petioled, ultimate segments 3–5-fid, lobes rounded. *Flowers* ½–¾ in., yellow, tips purple; racemes 1–3 in. *Posticous petal* convex, acute, dorsally winged, shorter than the cylindric spur. *Capsules* variable, linear-obovate or obovate-oblong; style short, persistent; pedicels short deflexed.

18. **C. chærophylla,** *DC. Prodr.* i. 128; stem erect leafy branched, leaves deltoid decompound, racemes terminal panicled, lower bracts leafy, spur slender. *Wall. Cat.* 1428; *Tent. Fl. Nip.* t. 40 (spur too short); *Don Prodr.* 198; *H. f. & T. Fl. Ind.* 269. C. geraniifolia, *H. f. & T. Fl. Ind.* 269.

TEMPERATE HIMALAYA, alt. 6–10,000 ft.; from Sikkim to Kumaon.

Stem 2–4 ft., branched above. *Leaves* pale beneath; lower and radical 6–10 in., long-petioled, upper subsessile, lower pinnæ petioled, second and third decurrent, ultimate segments oblong, acute or acuminate. *Flowers* ¾ in., golden-yellow, slender; bracts oval or oblong, cut, upper entire. *Posticous petal* concave, acute, dorsal wing narrow, shorter than the spur. *Capsules* ⅓ in., broad-linear or linear-obovate, spreading; pedicels short. *Seeds* few, shining.—*C. geraniifolia* is a large lax leafy state, with much-cut bracts and more acute segments, found in humid districts of Sikkim.

**** Root fusiform. Stem simple or branched. Spur short saccate (except 24, *crassifolia*).

† *Leaves 2–3-pinnatisect or decompound.*

19. **C. latiflora,** *H. f. & T. Fl. Ind.* 370; dwarf, glaucous, stem simple, leaves 2–3-pinnate cauline 2 opposite, flowers 3–6 subumbellate, bracts linear.

ALPINE HIMALAYA; Tunkra pass in Sikkim, alt. 15,000 ft., *H. f.*

Rootstock slender, 6–12 in., with many membranous oblong mucronate scales ½–1 in. long. *Stem* or scape 2–4 in. *Leaves* many, 1–2 in., ovate or ovate-deltoid, long-petioled; pinnæ petioled, alternate, small, linear-oblong, acute. *Flowers* ¾ in. long, very broad, pale blue, tips yellow; bracts ½–1 in., equalling the pedicels. *Posticous petal* broadly winged, much larger than the obtuse spur.

20. **C. stricta,** *Stephan;* stout erect, simple or branched, leaves thick, 2-pinnate sheaths rigid, cauline similar, alternate, racemes short simple or branched, bracts small subulate, capsules linear pendulous. *Led. Fl. Alt.* iii. 244; *Ic. Fl. Ross.* t. 56. C. astragalina, *H. f. & T. Fl. Ind.* 270.

WESTERN TIBET, alt. 14–16,000 ft. in Nari, *Jacquemont*, and Ladak, *T. T.*—DISTRIB. Altai Mts.

Rootstock crowned with rigid shining leaf-bases. *Stem* 1–2 ft. *Leaves* many, 3–6 in., petioles long, oval or oblong, glaucous, pinnules cut into linear-oblong lobes. *Flowers* ⅔–¾ in., yellow; pedicels short, slender, pendulous; bracts white, membranous. *Sepals* lanceolate from a broad ovate obliquely cordate fimbriate base. *Posticous petal* nearly flat, abruptly acuminate, margins membranous, tip recurved. *Capsules* 1–1½ in.; style short, rigid. *Seeds* large shining.

21. **C. meifolia,** *Wall. Tent. Flor. Nip.* 52, t. 41; *Cat.* 1427; stem stout erect leafy, leaves decompound segments linear or capillary, racemes

many-flowered dense, lower bracts leafy pectinate, capsules oblong. *DC. Prodr.* i. 128; *H. f. & T. Fl. Ind.* 271. C. Hoffmeisteri, *Klotzsch in Pr. Wald. Reise*, t. 35.

HIMALAYA, alt. 12–15,000 ft., from Sikkim to Kunawur.

Rootstock stout, branched. *Stems* 6–18 in., simple or branched. *Leaves* very many, 4–8 in., oblong, segments crowded acuminate. *Flowers* ½–¾ in., yellow, tips purple; racemes 1–2 in.; lower pedicels often elongate. *Posticous petal* obtuse, dorsal wing broad, twice as long as the obtuse spur. *Capsules* ½ in., pedicel curved. *Seeds* 4–6 shining.

†† *Leaves simply pinnate or trisect.*

22. **C. flabellata,** *Edgew. in Trans. Linn. Soc.* xx. 30; glaucous, stem erect rigid much-branched, leaves pinnate, pinnæ 4–6 pair flabelliform, racemes strict panicled dense-flowered, bracts very small, capsules linear. *H. f. & T. Fl. Ind.* 271.

WEST TIBET and TIBETAN HIMALAYA, alt. 9–12,000 ft., from Kumaon, *Edgeworth*, to Gilgit, *Winterbottom*.

Stem 2–3 ft., striate. *Leaves* 6–8 in.; pinnæ distant, ½–1½ in. diam., crenate or lobed. *Flowers* ½–¾ in., yellow, curved, racemes 2–6 in. long; pedicels very short. *Posticous petal* obtuse, cucullate, twice as long as the decurved inflated spur. *Capsule* ½–1 in., spreading or deflexed; style slender. *Seeds* 8–10, dotted, shining.

23. **C. adiantifolia,** *H. f. & T. Fl. Ind.* 271; glaucous, stems many-branched, leaves pinnate, pinnæ 2–5 pair orbicular or reniform, racemes terminal dense many-flowered, bracts subulate exceeding the buds, capsules linear.

WESTERN TIBET; Zanskar (not Kishtwar as in Fl. Ind.), alt. 12–14,000 ft., *T. T.*

Rootstock stout, woody, crowned with withered sheaths. *Stems* 6–18 in., branched from the base. *Leaves* 3–6 in., linear-oblong; pinnæ remote, ½–¾ in. diam., entire crenate or 3–5-lobed, base cuneate or cordate. *Flowers* ¾–1 in., yellow, tips brown; racemes 1–3 in.; pedicels very short. *Sepals* membranous, long-subulate, base lacerate. *Posticous petal* nearly straight, slender, abruptly acuminate, much longer than the inflated obtuse incurved spur. *Capsule* 1 in., acuminate at both ends; style straight.—Very near *C. flabellata*, but smaller, pinnæ often cordate, and bracts setaceous like soft hairs.

24. **C. crassifolia,** *Royle Ill.* 69; glaucous, stem simple, leaves thick reniform 3–5-lobed or -partite, racemes terminal dense-flowered simple or branched, bracts leafy obovate-lanceolate or spathulate entire, capsules subglobose inflated. *H. f. & T. Fl. Ind.* 261. C. crassissima, *Cambess. in Jacq. Voy. Bot.* 12, t. 11; *Thoms. in Hook. Kew Journ. Bot.* v. 17 *and* iv. t. 9. C. physocarpa, *Cambess. l.c.* t. 12.

WEST TIBET and TIBETAN HIMALAYA, alt. 14–17,000 ft., from Kunawur to Balti.

Rootstock prostrate, woody. *Stem* 3–8 in. *Radical leaves* few, 2–5 in. diam., early withering, almost fleshy, long-petioled; lobes crenate or again lobed, with petioled lobulate or palmati-partite (rarely pinnate) segments; cauline 1–3, subsessile. *Flowers* ¾–1¼ in., white or yellowish, variegated with purple, racemes 1–3 in. long. *Posticous petal* broad, obtuse, wingless, equalling the cylindric incurved spur. *Capsule* 1 in. diam.; style short, persistent.

4. **FUMARIA,** Linn.

Annual, rarely perennial herbs, usually branched, often scandent. *Leaves* much divided, segments very narrow. *Flowers* small, white, rose-coloured or purplish, in terminal or leaf-opposed racemes. *Sepals*, *petals* and *stamens* of *Corydalis*. *Ovary* 1-celled; style filiform, stigma entire or shortly lobed;

ovules 2, on 2 placentas. *Fruit* indehiscent, globose, 1-seeded.—Distrib. Species about 8; usually agrarian weeds of the temperate regions of the Old World.

1. **F. parviflora,** *Lamk.* sub-sp. Vaillantii, *Loisel* (sp.); diffuse, leaf-segments flat, racemes lax-flowered, sepals lanceolate much smaller than the corolla-tube, pedicels exceeding the bracts, fruit globose rugose when dry rounded at the top with 2 pits.

Indogangetic plain, Lower Himalaya and Nilghiri Mts., a weed of cultivation. —Distrib.: of the genus.

Pale green, much branched. *Racemes* 1–2 in. *Flowers* $\frac{1}{4}$–$\frac{1}{3}$ in., whitish or rose-coloured, tips purple.

Order X. **CRUCIFERÆ.** (By Hooker f. & T. Anderson.)

Herbs, rarely undershrubs; juice watery, often pungent. *Leaves* cauline and radical, the latter in a rosette, cauline alternate, exstipulate. *Flowers* racemed, rarely solitary on scapes, or axillary. *Sepals* 4, free, 2 lateral (opposite the placentas) often large and saccate at the base, imbricate. *Petals* 4, free, hypogynous, placed crosswise, imbricate. *Stamens* 6 (rarely 1, 2, or many); 2 outer opposite the lateral sepals; 4 inner longer, in opposite pairs. *Disk* with usually 4 glands opposite the sepals. *Ovary* 2-celled by a placental membrane, or 1-celled, or with superimposed cellules; style short or 0; stigma simple or with 2 lobes opposite the placentas; ovules 1–2 or ∞, 2-seriate on two parietal placentas, rarely solitary and erect. *Fruit* either a 2-celled 2-valved pod, the valves deciduous and leaving the seeds on the persistent placentas (*replum*), or indehiscent, or transversely jointed. *Seeds* small, albumen 0; cotyledons large, plano-convex or longitudinally concave or folded, foliaceous in germination; radicle turned up on the back of one cotyledon (*incumbent*), or facing the edges of both (*accumbent*).—Distrib. Genera 172; species about 1200; natives chiefly of temperate regions of the Old World.

Series A.

Pods long or short, dehiscing throughout their length, terete 4-angled or compressed dorsally (parallel to the septum).

Tribe I. **Arabideæ.** *Pods* narrow, long. *Seeds* usually 1-seriate. *Cotyledons* accumbent. (Pods sometimes short in 2, *Parrya*, 5, *Nasturtium* and 10, *Notoceras*; seeds 2-seriate in *Arabis glabra*, and in some species of 2, *Parrya*.)

* *Sepals narrow, erect. Valves without horns or appendages. Stigmas erect, connate or decurrent on the style* (2-lobed in some species of 2. *Parrya*).

Erect branched hoary herbs	1. Matthiola.
Low alpine tufted scapigerous herbs	2. Parrya.

** *Sepals broad or narrow. Stigma undivided or shortly 2-lobed.* (See also 2, *Parrya*.)

Sepals erect, lateral saccate.—Hoary leafy erect herbs	3. Cheiranthus.
Anthers of long stamens 1-celled.—A minute herb	4. Atelanthera.
Sepals spreading, not saccate; pods tumid, seeds minute 2-seriate. Flowers usually yellow	5. Nasturtium.
Sepals not saccate; pods 4-angled; seeds 1-seriate. Flowers yellow	6. Barbarea.

Sepals erect, not saccate; pods flat, strongly nerved; seeds flattened.—Flowers white or rose	7. Arabis.
Sepals not saccate; pods of *Arabis* but hardly nerved, usually acute; stamens simple.—Flowers white or purple	8. Cardamine.
Sepals spreading, not saccate; long stamens bent above the middle.—A minute herb; flowers few, purple	? 9. Loxostemon.

*** *Valves with horns or appendages.*

Pods short, valves septate within	10. Notoceras.

Tribe II. **Alyssineæ.** *Pods* short, broad. *Seeds* usually 2-seriate. *Cotyledons* accumbent. (Pod sometimes long and seeds 1-seriate in 11, *Farsetia*, and cotyledons rarely incumbent in 13, *Draba*. See also 2, *Parrya*.)

* *Pods 2-celled, many-seeded; seeds compressed, often winged.*

Pods sessile; seeds 1-seriate	11. Farsetia.

** *Pods* 1–2-*celled*, 2–*many-seeded; valves often tumid; seeds* 2-*seriate, rarely winged.* (Sepals never saccate; flowers *white or yellow.*)

Stamens often appendaged; pods usually orbicular and 4-seeded.—Hoary herbs	12. Alyssum.
Stamens not appendaged; pods longer than broad, many-seeded. Petals entire.—Hoary herbs	13. Draba.
Characters of *Draba* but petals 2-fid	14. Erophila.
Sepals short, spreading.—Glabrous herbs	15. Cochlearia.

Tribe III. **Sisymbrieæ.** *Pods* usually sessile, long, narrow. *Seeds* usually 1-seriate (2-seriate in 19, *Eutrema*); cotyledons straight, flat, incumbent.

* *Stigmatic-lobes erect, free, or connate in a cone.*

Pod rigid, terete. Flowers white or purple	16. Malcolmia.

** *Stigma capitate emarginate or shortly* 2-*lobed.*

Stamens with a broad basal scale	17. Lepidostemon.
Sepals erect or spreading; pod many seeded, valves 1–3-nerved; seeds usually 1-seriate.—Hairs simple or 0	18. Sisymbrium.
Sepals short, erect; pods terete, valves 1-ribbed; seeds usually 2-seriate.—Glabrous herbs	19. Eutrema.
Sepals long; pods compressed.—Leaves quite entire glabrous glaucous	20. Conringia.
Sepals erect; valves keeled.—Hairs appressed forked	21. Erysimum.
Sepals suberect; pods linear-lanceolate, flattened; seeds few.—A fleshy herb	22. Christolea.

Tribe IV. **Camelineæ.** *Pods* short or long. *Seeds* usually 2-seriate; cotyledons flat, incumbent. (See also 13, *Draba*.)

Seeds few, large.—Tufted scapigerous herbs	23. Braya.

Tribe V. **Brassiceæ.** *Pods* short or long; cotyledons longitudinally folded or deeply grooved.

* *Stigma capitate, truncate or* 2-*lobed.*

Pods long; seeds 1-seriate	24. Brassica.
Pods long, compressed; seeds 2-seriate	25. Diplotaxis.
Pods short, turgid, beaked; seeds 2-seriate	26. Eruca.

** *Stigmas connate, forming an erect cone.*

Pods long.—A glaucous large herb or undershrub . . . . . 27. MORICANDIA.

Series B.

Pods short, dehiscing throughout their length, compressed laterally (at right angles to the septum). (Pod indehiscent in 31, *Megacarpæa.*)

TRIBE VI. **Lepidineæ.** *Cotyledons* incumbent, straight curved or longitudinally folded.

Pods many-seeded; valves not winged . . . . 28. CAPSELLA.
Pods few-seeded; valves winged or not . . . . 29. LEPIDIUM.
Pods 2-seeded; valves with 2 dorsal crests . . . . 30. DILOPHIA.

TRIBE VII. **Thlaspideæ.** *Cotyledons* accumbent, straight.

Pods indehiscent, 2-seeded.—Tall herbs of umbelliferous habit . 31. MEGACARPÆA.
Pods compressed notched; valves winged or keeled . . . . 32. THLASPI.
Pods elliptic or oblong, acute; valves keeled . . . . 33. IBERIDELLA.

Series C.

Pods short, indehiscent, not jointed, usually hard, either 1-celled and 1-seeded, or with 2–4 1-seeded cellules in parallel series.

TRIBE VIII. **Isatideæ.** Characters of the series.

Pods 1-celled, oblong or linear, wing thick.—Glaucous herbs . 34. ISATIS.
Pods 1-celled, cymbiform, wing incurved.—Glaucous herbs . . 35. TAUSCHERIA.
Pods 1-celled, small oblong, with a thin wing.—A glandular twiggy undershrub . . . . 36. DIPTERYGIUM.
Pods 1-celled, wingless, globose with a subulate style.—A hairy herb . . . . 37. NESLIA.
Pods 2-celled, obliquely beaked . . . . 38. EUCLIDIUM.

Series D.

Pods long or short, transversely jointed; joints indehiscent, or the lower 2-valved or reduced to a pedicel for the upper.

TRIBE IX. **Cakilineæ.** Characters of the series.

Lower joint of pods a seedless pedicel, upper globose 1-seeded . 39. CRAMBE.
Lower joint of pods a seedless pedicel, upper 2-celled, 2-seeded 40. PHYSORHYNCHUS.

Series E.

Pods long, not jointed, indehiscent, either 1-celled and many-seeded, or breaking up into many 1-celled 1-seeded indehiscent fragments.

TRIBE X. **Raphaneæ.** Characters of the series.

Pods long, terete, hollow or septate; seeds globose, 2–3-celled . 41. RAPHANUS.
Pods short, curved, 4-angled, 2–3-celled, moniliform . . . . 43. GOLDBACHIA.
Pods short, curved, many-celled . . . . 43. CHORISPORA.

1. MATTHIOLA, Br.

Annuals, or small undershrubs, with hoary and sometimes stellate pubescence. *Leaves* entire or sinuate. *Flowers* rather large, purple; bracts 0. *Sepals* erect, lateral saccate at the base. *Petals* spreading, claws long. *Pod* long, narrow, cylindric or flattened; septum thick; stigma small, erect, lobes parallel, thickened or with short horns at the base. *Seeds* 1-seriate, flattened, with a narrow membranous wing.—DISTRIB. About 30 species; natives of the Mediterranean region, Arabia and Western and Central Asia.

M. incana, the common Stock, and *M. tristis* are cultivated in the gardens of N. India.

1. **M. odoratissima,** *Br. in Hort. Kew. ed.* 2. iv. 120; leaves petioled lower obovate upper lanceolate sinuate or pinnatisect rarely entire. *DC. Prodr.* i. 134; *Bot. Mag.* 1711; *Boiss. Fl. Orient.* i. 149; *Griff. It. Notes*, 282, n. 767; *H. f. & T. in Journ. Linn. Soc.* v. 134.

WEST TIBET in dry stony places, ascending to 12,000 feet.—DISTRIB. Westward to Asia Minor and the Caucasus.

A perennial, 1–2 ft.; hoary with stellate pubescence; root woody. *Racemes* long, erect; flowers few, large, purple, fragrant. *Petals* ¾–1 in.; limb linear-oblong or strap-shaped, waved or twisted. *Pods* 4 in., erect, rigid, flattened. *Seeds* as broad as the septum.

2. PARRYA, Br.

Small tufted herbs; rootstock thick, perennial, many-headed. *Leaves* linear or spathulate, entire sinuate or pinnatifid. *Flowers* large, white or purple, racemed or on scapes. *Sepals* erect, lateral sometimes saccate at the base. *Pod* much flattened, short and broad or elongated and narrow; valves smooth, with a midrib; septum entire or divided, membranous or hyaline; style short; stigma-lobes erect, decumbent. *Seeds* 1–2-seriate, much flattened, with a membranous wing or wingless.—DISTRIB. Species about 10, artic or high alpine.

1. **P. exscapa,** *Mey. in Led. Fl. Alt.* iii. 38; leaves spathulate obtuse entire or slightly toothed, scapes 1-flowered, seeds winged. *Led. Ic. Fl. Alt.* t. 86; *H. f. & T. in Journ. Linn. Soc.* v. 135.

WEST TIBET, alt. 15–18,000 ft.—DISTRIB. Altai Mts.

Stemless, glabrous or puberulous. *Flowers* purple, scapes shorter than the leaves. *Pods* ½–3 in. long, narrow, drooping. *Stigma* sessile. *Seeds* 1–2-seriate; wing broad, membranous.

2. **P. macrocarpa,** *Br. in Parry's Voy. app.* 270; leaves entire or sinuate-toothed, flowers corymbose, scapes much exceeding the leaves, pods linear, seeds winged. *Led. Fl. Ross.* i. 131; *Hook. Fl. Bor. Am.* i. t. 15; *H. f. & T. in Journ. Linn. Soc.* v. 135. Neurotoma nudicaule *and* scapigerum, *DC. Prodr.* i. 156.

Alpine region of WEST TIBET, alt. 15–18,000 ft.—DISTRIB. Affghanistan, Altai, arctic Europe Asia and America.

Slightly rough, very rarely glabrous. *Leaves* tufted, thick, petioled, lanceolate. *Flowers* large; scapes 6–12 in., rigid, many-flowered. *Pods* erect, linear, acute; valves strongly veined, rough. *Seeds* 1-seriate, much flattened.

3. **P. platycarpa,** *H. f. & T. Journ. Linn. Soc.* v. 136; leaves spathulate or obovate quite entire, scapes short few-flowered, pods ovate, seeds not winged.

EASTERN HIMALAYA, in the Tibetan region of SIKKIM, alt. 16–17,000 ft., *H. f.*

Rootstock covered with spongy old petioles. *Leaves* leathery, glabrous or with hairy margins; petiole long, base sheathing. *Scapes* pilose, thick, sometimes bearing 1 or 2 small leaves. *Pods* ¾–1¼ in., tapering into the short thick style; valves thin, convex, not veined, midrib distinct. *Seeds* few.

4. **P. lanuginosa,** *H. f. & T. Journ. Linn. Soc.* v. 136; leaves spathulate coarsely toothed, scapes woolly 8–12-flowered, pods ovate-lanceolate, seeds not winged.

West Tibet; in Gugi, alt. 17,500 ft., *Strach. & Winterb.*

Small, densely woolly. *Scapes* erect, 2 in.; flowers small, racemose. *Sepals* spreading, woolly. *Petals* broadly spathulate, undulate or crisped. *Pods* acute, about ¾ in., outline waving; septum very narrow, sometimes 0.

3. CHEIRANTHUS, *Linn.*

Hoary herbs, or undershrubs, with appressed bipartite hairs. *Leaves* oblong-linear, entire or toothed. *Flowers* large, yellow or purple, racemed. *Sepals* erect, lateral saccate at the base. *Petals* clawed. *Pod* 4-angled, compressed; valves 1-nerved; septum membranous; stigmatic-lobes short, spreading. *Seeds* 1-seriate, flattened, without a border; cotyledons accumbent, very rarely imcumbent.—Distrib. Species about 12, natives of temp. Europe, N. Africa, W. Asia, and arctic America.

The Wall-flower, *C. Cheiri*, is cultivated in gardens in N. India, but is not indigenous.

1. **C. parryoides,** *Kurz. mss.* (name only); hoary, leaves linear-oblong entire all radical, flowers purple, style ⅙ in.

West Tibet; in Spiti, *Stoliczka.*

Rootstock covered with withered petioles. *Leaves* all radical, 2–3 in., rounded at the tip, clothed with fine dense tomentum. *Scapes* about 9 in., many-flowered, elongating during flowering. *Pedicels* ¾–1 in., erect, tomentose. *Sepals* ⅙ in, hairy, purple, with a glabrous narrow membranous fringe. *Petals* ⅓ in., claw and base of the blade dark purple. *Pods* (immature) curved and undulate, densely tomentose; style $\frac{1}{12}$ in., glabrous.

2. **C. himalayensis,** *Camb. in Jacq. Voy. Bot.* 14, t. 13; leaves linear-spathulate entire lobed or rarely subpinnatifid, flowers violet or purplish, pods hairy, stigma sessile. C. himalaicus, *H. f. & T. Journ. Linn. Soc.* v. 137.

West Tibet; amongst rocks and loose stones, alt. 15–17,000 ft.

Rootstock much divided. *Stems* 2–6 in., numerous, leafy, tomentose. *Leaves* somewhat tufted. *Flowers* numerous, in rather dense terminal racemose heads, fragrant. *Sepals* short, lanceolate, obtuse, lateral scarcely saccate at the base. *Petals* twice the length of the sepals, broadly spathulate, retuse. *Pods* ¾–1½ in., linear, compressed; valves with thickened margins. *Seeds* numerous, sub-2 seriate.

3. **C. Stewartii,** *T. Anders.*; leaves spathulate toothed at the tip, flowers buff then purple, pods glabrous, stigma sessile.

West Tibet, near Ladak, at 15–16,500 ft. elevation, *Stewart.*

Like the preceding but differing in its glabrous pods and less divided leaves. *Stems* numerous, slender, erect in flower, depressed and spreading in fruit. *Lower leaves* ½–1 in., subcoriaceous, woolly; upper smaller, linear, entire. *Racemes* terminal, subcapitate, fruiting 3 in. *Sepals* oblong, $\frac{1}{12}$ in. *Petals* ⅕ in., broadly spathulate. *Pods* 1–1½ by ⅙ in., erect, secund, linear, tapering at both ends; valves flat, herbaceous; stigma broad; midrib and reticulated veins distinct. *Seeds* small, ovate-oblong, sub-2-seriate; cotyledons accumbent.

4. **C. albiflorus,** *T. Anders.;* leaves subspathulate or linear-lanceolate entire or sublobed, petals white, pods tomentose, style short. Cheiranthi sp. *H. f. & T. in Journ. Linn. Soc.* v. 138, *in note.*

Zanskar in West Tibet, alt. 12–16,000 ft., *T. T.*

A small, hoary, minutely tomentose, tufted perennial. *Stems* slender, covered below by withered petioles. *Lower leaves* loosely tufted; upper linear-lanceolate, entire, rarely toothed. *Flowers* in short, close racemes. *Sepals* linear, tomentose; border narrow, glabrous, membranous. *Petals* spathulate, obtuse or slightly retuse, white. Very young *pods* linear, densely tomentose, many-seeded; style short, glabrous.

4. **ATELANTHERA,** *H. f. & T.*

A minute slender annual, slightly rough with bipartite appressed hairs. *Leaves* few, linear, entire. *Flowers* small, subsessile. *Sepals* erect, equal at the base. *Petals* narrowly spathulate, emarginate. *Anthers* of all the stamens with a short claw at the tip, of the long stamens 1-celled. *Pod* linear, compressed; septum membranous; style short; stigma 2-lobed. *Seeds* 1-seriate, flattened, without a border.

1. **A. perpusilla,** *H. f. & T. Journ. Linn. Soc.* v. 138; pods few erect nearly 1 in. long, valves faintly nerved.

Zanskar in West Tibet, *T. T.*

5. **NASTURTIUM,** Br.

Terrestrial or aquatic, branched, glabrous or hairy herbs. *Leaves* entire lobed or pinnatifid. *Flowers* small, yellow, rarely white, sometimes bracteate. *Sepals* short, spreading, equal at the base. *Petals* short, narrowed at the base, scarcely clawed, or 0. *Stamens* 2, 4 or 6. *Pod* long or short, almost cylindric; valves faintly 1-nerved; septum thin, transparent; style variable, short or long and slender, stigma entire or 2-lobed. *Seeds* small, turgid, 2-seriate or irregularly 1-seriate; cotyledons accumbent.—Distrib. Species about 20, temp. and tropical.

1. **N. officinale,** *Br. in Hort. Kew.* ed. 2, iv. 110; aquatic, stem creeping and floating, leaves pinnate, leaflets sinuate-lobed, flowers white. *DC. Prodr.* i. 137; *Griff. Itin. Notes,* 275, n. 660; *H. f. & T. in Journ. Linn. Soc.* v. 130. (Watercress.)

Rohilkund, *T. T.;* Punjab, *Stewart;* also found near all the hill stations, but probably introduced.—Distrib. Affghanistan; temp. Europe and Asia.

Stem much branched. *Leaves* pinnate, the upper with 3–7 pinnules and a terminal one, the lower cut into 3 repand segments. *Flowers* small, in short racemes. *Petals* longer than the sepals. *Pods* ⅓–1 in., stalked, spreading or bent upwards. *Seeds* small, 2-seriate.

2. **N. palustre,** *DC. Syst. Veg.* ii. 191; suberect, radical leaves pinnatifid, flowers ebracteate yellow, pods short thick. N. terrestre, *Br. in Hort. Kew.* ed. 2, iv. 110; *H. f. & T. Journ. Linn. Soc.* v. 158. N. heterophyllum, *Don Prodr. Fl. Nep.* 202.

Abundant in the Temperate Himalaya, ascending to 10,000 ft.; and in N.W. India; rare in Assam and Bengal.—Distrib. Many temperate regions.

Stems weak, smooth, slightly hairy. *Radical leaves* numerous, petioled; lobes broad, often sinuate-toothed, terminal larger, ovate-lanceolate, much toothed; cauline subsessile, deeply toothed or pinnatifid. *Flowers* small, in long lax racemes. *Petals* about equalling the sepals. *Pods* ⅙–¼ in., slightly curved when ripe, pedicels either horizontal or deflexed. *Seeds* crowded, 2-seriate.

3. **N. indicum,** *DC. Syst. Veg.* ii. 199; erect, radical leaves deeply pinnatifid, flowers bracteate or ebracteate yellow, pods long narrow. *H. f. & T. Journ. Linn. Soc.* v. 138. N. madagascariense, *W. & A. Prodr.* 19; *Wight Ill.* t. 13. N. heterophyllum, *Blume Bijd.* 50. Sinapis divaricata, *Roxb. Fl. Ind.* iii. 123.

Common in damp places throughout India from CEYLON to MISHMI and KASHMIR.—DISTRIB. Malayan Archipelago; Philippines, China, Japan.

A rough hairy or sometimes glabrous annual. *Stem* 6–12 in., erect, striated, branching from near the base. *Lower leaves* petioled, rarely entire, lobes generally toothed; upper lyrate, frequently with small auricles. *Racemes* long, many-flowered. *Flowers* small. *Petals* equalling the sepals. *Pods* cylindric ½–¾ in., spreading or ascending. *Seeds* very numerous, small, rugose, 2-seriate.—Some of the states of this variable plant closely resemble *N. palustre*, but have longer and less turgid pods.

VAR. *benghalense; DC. Syst.* ii. 198 (*Sp.*); flowers bracteate, bracts sessile leaf-like shorter than the pedicels linear-lanceolate variously toothed or entire. *H. f. & T. in Journ. Linn. Soc.* v. 139.—Eastern Bengal, Sikkim, and the Hooghly; Assam and Silhet to Chittagong, Tenasserim.—(China.)

4. **N. montanum,** *Wall. Cat.* 4778 (*partly*); radical leaves sinuate-pinnatifid, flowers bracteate yellow, pods short turgid. *H. f. & T. Journ. Linn. Soc.* v. 139. Sinapis pusilla, *Roxb. Fl. Ind.* iii. 125.

Subtropical Himalaya from SIKKIM to the PUNJAB, ascending to 7000 ft; the KHASIA HILLS and BIRMA.—DISTRIB. Java, China, Japan.

An annual much resembling *N. indicum*, but less robust, with larger smoother less divided leaves. *Pods* 1–1½ in., slender, not turgid.

6. **BARBAREA,** Br.

Perennial or biennial branched leafy herbs with angled stems and lyrately pinnatifid leaves. *Flowers* yellow. *Sepals* suberect, subequal at the base. *Petals* with a broad claw. *Pod* long, linear, compressed, 4-angled, many-seeded; valves hard, stout; usually strongly keeled. *Seeds* small, 1-seriate, ovoid, without a margin; cotyledons accumbent.—DISTRIB. Species about 20, chiefly European.

1. **B. vulgaris,** *Br. Hort. Kew.* ed. 2, iv. 109; perennial, usually branched, pods strongly keeled. *DC. Prodr.* i. 140; *H. f. & T. in Journ. Linn. Soc.* v. 139.

Temperate and subalpine HIMALAYA and W. TIBET; alt. 6–10,000 ft.—DISTRIB. Europe, W. Asia, N. and S. Africa, Australia.

Stiff, erect, smooth. *Stems* 9–18 in., furrowed, green, leafy. *Lower leaves* petioled, lyrate-pinnate, terminal lobe large subrotund; upper leaves sessile, obovate, entire sinuate or pinnatifid at the base, lowest lobes auricled stem-clasping. *Pods* ⅔–1½ in., numerous in a crowded raceme, narrow-linear, rigid; pedicels erect or spreading; style about $\frac{1}{12}$ in., stout, straight.

VAR. 1. *taurica, DC. Syst.* ii. 207 (*Sp.*); upper leaves ovate entire or toothed, pedicels of the ripe pods almost horizontal, pods erect stout rigid a little curved, style rather long and slender. *Griff. Itin. Notes* 306 *n.* 1047–1503. B. Iberica, *DC. l.c.* 208; B. arcuata, *Reichenb. Ic. Fl. Germ.* t. 48; B. præcox, *Fries. Nov.* 206, *in Herb. Kew.* (*not of others*).—Kashmir and W. Tibet, alt. 6–10,000 ft. (Affghanistan, W. Asia, and throughout Europe.)—The fully ripe pods of Affghan specimens vary from ¾–1½ in.

VAR. 2. *sicula, Presl. delic. Prag.* (*Sp.*); less robust, lower leaves lyrate, terminal lobes ovate, lateral often wanting, upper leaves pinnate, segments linear, pedicels less spreading, pods straight narrow compressed subtorulose, style short almost as broad as the pod.—B. intermedia, *Boreau Flor. Cent. France*, ii. 40.—W. Tibet and Temperate Himalaya, alt. 6–17,000 ft; Nilghiri Mts. (Asia Minor, S. Europe.)

2. **B. elata,** *H. f. & T. Journ. Linn. Soc.* v. 140; biennial, simple, pods faintly 1-nerved.

Inner ranges of SIKKIM, alt. 11–13,000 ft., always near villages, *H. f.*

Glabrous or sparsely hairy. *Stem* 2–3 ft., stout, generally simple, striated. *Radical leaves* lyrate-pinnatifid, terminal lobe oblong obtuse sinuate; cauline leaves auricled, obovate, entire sinuate-lobed or coarsely toothed. *Racemes* very long, few-flowered. *Petals* bright yellow. *Pedicels* erect, thick, shorter than the pod. *Pods* ⅓–⅔ in., thick, turgid; style short, distinct; valves convex, midrib indistinct.

7. **ARABIS,** Linn.

Glabrous or pubescent annuals or perennials, sometimes with stellate pubescence. *Radical leaves* spathulate, often rosulate; cauline sessile, entire or toothed. *Flowers* racemed, ebracteate, white rarely purple or rose-coloured. *Sepals* short, erect, lateral saccate. *Petals* entire, usually clawed. *Pod* long, slender, linear, compressed; valves smooth, flat, keeled or ribbed; septum linear, membranous; stigma subsessile. *Seeds* ovoid or orbicular, compressed, margined or wingless, 1- or sub-2-seriate; cotyledons accumbent.—DISTRIB. Species about 130, abundant in N. Asia, Europe, and N. America, rare in the S. hemisphere.

* Cauline leaves many, auricled at the base. Flowers racemose. Pods glabrous. Seeds 2-seriate.

1. **A. glabra,** *Crantz. Stirp. Austr.* 36; stem 1–3 ft., radical leaves obovate-oblong hispid with stellate hairs, flowers small, pods erect crowded glabrous. *H. f. & T. Journ. Linn. Soc.* v. 140. A. perfoliata, *Lam.; Boiss. Fl. Orient.* i. 167. Turritis glabra, *DC. Prodr.* i. 142. *Reich. Ic. Fl. Germ.* t. 44, f. 4346. T. rigida, *Wall. Cat.* 4783.

Western Himalaya, from KUMAON to KASHMIR, alt. 6–10,000 ft.—DISTRIB. Temp. Europe, Asia, N. America; Alps of Australia.

A stiff, erect, glaucous annual or biennial. *Stem* generally simple, striated, glabrous or slightly hairy at the base. *Radical leaves* spreading, soon withering, entire or sinuate-toothed or pinnately lobed, rough on both surfaces; cauline oblong-lanceolate, entire, auricled, glabrous. *Flowers* straw-coloured or white. *Fruiting racemes* much elongated. *Pods* 2–3½ in., pedicelled, narrow, linear; valves flat, 1-nerved; septum crumpled. *Seeds* 2-seriate.

** Cauline leaves many, auricled at the base. Flowers racemose. Pods usually hairy. Seeds 1-seriate.

2. **A. auriculata,** *Lam. Dict.* i. 219; annual, stellately hairy, leaves sinuate-toothed, cauline with obtuse or apiculate basal lobes, flowers small, stigma sessile. *Rich. Ic. Fl. Germ.* t. 39, f. 4334; *H. f. & T. Journ. Linn. Soc.* v. 141. A. Montbretiana *and* A. Aucheri, *Boiss. l.c.* 169, 170.

In KASHMIR, alt. 5–6000 ft., *T. T.*—DISTRIB. Affghanistan, W. Asia, Mediterranean

Stem 3–12 in., erect, simple or somewhat branched. *Radical leaves* spreading, petioled, ovate-oblong, obtuse; cauline ovate-oblong, obtuse, toothed. *Racemes* elongate, lax. *Flowers* white. *Pods* 1–1½ in., hairy?, narrow, straight, slender; stigma small; pedicel ¼ in., stout, erect or spreading. *Seeds* 1-seriate, very small.

3. **A. alpina,** *Linn.;* annual, hoary with forked or stellate hairs, leaves coarsely toothed, cauline with obtuse basal lobes, flowers large, pods erect or ascending. *DC. Prodr.* i. 142; *H. f. & T. in Journ. Linn. Soc.* v. 141.

A. albida, *Stev.; DC. l.c.* 142. A. pterosperma, *Edgew. in Trans. Linn. Soc.* xx. 33.

Western Himalaya, from KUMAON to MARRI, alt. 5–12,000 ft.—DISTRIB. Alpine and arctic Europe, Asia, N. America, Abyssinia.

Stems simple, or slightly branched. *Leaves* oblong-lanceolate, obtuse, seldom entire, radical spreading, petioled; cauline sessile. *Flowers* ⅓ in. diam., white. *Sepals* glabrous. *Petals* spathulate, with long claws. *Pods* 1½–2½ in., narrow-linear, erect when young, often spreading when ripe; pedicels slender, glabrous or hairy.—The Indian specimens differ from the more western in the glabrous sepals.

4. **A. amplexicaulis,** *Edgew. in Trans. Linn. Soc.* xx. 31; hispidly pilose, leaves coarsely toothed, cauline with obtuse basal auricles, pods horizontal or drooping, flowers large. *H. f. & T. in Journ. Linn. Soc.* v. 142.

Western Himalaya, from KUMAON to KASHMIR, alt. 4500–9000 ft.

A perennial resembling *A. alpina*, but larger, more robust, leaves broader, and horizontal on almost drooping pods. *Stem* 6–24 in., suberect, simple or slightly branched, hirsute, especially below. *Radical leaves* 1½–4 in. long, obovate-oblong; cauline sessile. *Racemes* long, lax, many-flowered. *Flowers* white. *Pods* linear, acute; style slender elongated. *Seeds* larger than those of *A. alpina*, wingless.

*** Cauline leaves many (few in *A. taraxicifolia*), not auricled at the base. Flowers racemed. Pods glabrous. Seeds 1-seriate.

5. **A. tibetica,** *H. f. & T. Journ. Linn. Soc.* v. 143; perennial, stellately hairy, leaves lobed or toothed, flowers small, pods suberect falcate. A. Thomsoni, *H. f. l.c.*

In KASHMIR and WESTERN TIBET, alt. 9–16,000 ft. *T. T.*, &c.

Stems 4–8 in., numerous, suberect, branched, leafy. *Radical leaves* rosulate, petioled, obovate or spathulate, more or less hairy; upper cauline sessile, lanceolate or narrowly spathulate, coarsely toothed or entire. *Flowers* numerous, white or pale pink. *Sepals* acute, sparsely stellately hairy. *Petals* twice as long as the sepals, spathulate, claw short. *Pods* 1½ in., narrow-linear, falcate, glabrous; valves veined; midrib distinct. *Seeds* small, not margined.—The fruiting specimens referred in Journ. Linn. Soc. to *A. Thomsoni* belong probably to a *Sisymbrium.*

6. **A. glandulosa,** *Kar. & Kir. En. Pl. Soong. in Bull. Soc. Imp. Mosc.* xv. 147; annual, glandular, leaves pinnatifid, flowers small, pods suberect obtuse. *H. f. & T. in Journ. Linn. Soc.* v. 143.

Tibetan region of SIKKIM, alt. 14–16,000 ft., *H. f.;* WESTERN TIBET near Ladak, *Stewart.*—DISTRIB. Soongaria.

Stem short, spreading, prostrate, leafy. *Radical leaves* ½–1 in., petioled; cauline ¼–½ in., sessile, linear, or entire. *Petals* ⅙ in., spathulate, claw short, pale rose or white. *Pods* 1 in., linear; style short tapering; pedicel short, thick, erect; valves concave, veined, with a faint midrib. *Seeds* small, oblong, slightly flattened, not margined.

7. **A. taraxacifolia,** *Anders.;* annual, hairy, stems spreading, radical leaves many long-petioled lyrate-pinnatifid or lobed, flowers few distant, pedicels slender, pods very narrow, style long acute.

PUNJAB; in sandy places near Peshawur, *Stewart.*

Stems 6–9 in., numerous, almost leafless, weak, glabrous above, subhispid near the base. *Radical leaves* rough, hairy; terminal lobe large, rounded, entire, rarely toothed; lateral short, narrow, entire obtuse; petiole 2–3 in.; cauline leaves few, sessile, oblong-lanceolate, entire or sinuate-toothed. *Sepals* pubescent or glabrous. *Petals* ⅕ in., narrow-oblong, pale rose or white; pedicels slender, spreading or suberect, glabrous. *Pods* 1½–2½ in., suberect horizontal or decurved, linear, flattened, glabrous; pedicel ½–1 in.; valves thin, veinless.—Closely allied to *A. arenosa*, L., but differs in the form of the leaves and length of the pod.

**** Flowers in leafless scapes.

8. **A. nuda,** *Belang. Voy. Ic.* (*without number or description*); leaves all radical obovate-oblong entire or toothed, flowers small, pods erect glabrous. *Boiss. in Ann. Sc. Nat. Sér.* 2, xvii. 54; *H. f. & T. Journ. Linn. Soc.* v. 142. Arabis scapigera, *Boiss. Ann. Sc. Nat. Sér.* 2, xvii. 54. Sisymbrium nudum, *Boiss. Fl. Orient.* i. 214.

KASHMIR, alt. 5600–6000 ft., *T. T.*—DISTRIB. Affghanistan to Asia Minor, and N. Syria.

A small annual, with slightly hairy leaves. *Scapes* several, 1–5 in., erect, rigid and not spreading, many-flowered, glabrous or slightly hairy at the base. *Flowers* yellow. *Sepals* equal, obtuse, green, glabrous. *Petals* twice as long as the sepals. *Pods* 1–1½ in. on very short thick pedicels, straight or curved, linear, much flattened, obtuse; valves with a distinct midrib and prominent veins. *Seeds* not margined; cotyledons accumbent (hence an *Arabis*, but most closely allied to *Sys. thalianum*).

8. CARDAMINE, Linn.

Annual or perennial, glabrous or slightly pubescent, often flaccid herbs. *Leaves* entire lobed or pinnate. *Flowers* white, pale-purple or violet, very rarely yellow. *Sepals* equal at the base. *Petals* clawed. *Pod* narrow-linear, compressed, tapering at both ends; valves with a distinct midrib, opening elastically; septum membranous; stigma simple or 2-lobed. *Seeds* flattened, without a border, 1-seriate; cotyledons accumbent.—DISTRIB. About 60 species, natives of the N. and S. temperate regions.

* *Leaves not deeply lobed or pinnatisect.*

1. **C. violacea,** *Wall. Cat.* 4782; stem stout simple erect, leaves sessile amplexicaul lanceolate toothed, flowers large violet, style long. *H. f. & T. in Journ. Linn. Soc.* v. 145.

Temperate region, central NIPAL, *Wallich.*

Stem 2–5 ft. *Leaves* 3–5 in., tapering to the tip, auricles sagittate. *Flowers* racemed, ½–¾ in. broad. *Pods* ¾ in., on thickened pedicels, erect, tapering at both ends; style ¼ in.

2. **C. circæoides,** *H. f. & T. Journ. Linn. Soc.* v. 144; annual, almost glabrous, slender, leaves petioled cordate obtuse, flowers small white, style short.

Moist woods in the interior of SIKKIM, alt. 5–7000 ft., *J. D. H.*

Stem 6–12 in., simple or slightly branched. *Leaves* thin, radical on much longer stalks than the cauline, sinuate-toothed, lower lobes rounded. *Racemes* few-flowered. *Pods* 1 in., on short pedicels, erect or spreading, narrow-linear; stigma broad.

** *Radical leaves trifoliolate.*

3. **C. africana,** *Linn.*; perennial, leaflets petioled crenate-serrate, flowers dull white, funicles not winged. *H. f. & T. Journ. Linn. Soc.* v. 144. C. borbonica, *Pers.*; *DC. l.c.*; *Thwaites Enum.* 399; *W. & A. Prodr.* 20; *Wight Ic.* t. 941. C. anteniquana, *DC. l.c.* C. Wightiana, *Wall. Cat.* 4781.

Mountain woods of the WESTERN PENINSULA, and CEYLON.—DISTRIB. S. temp. and tropical Africa; Bourbon.

Stem 6–24 in., decumbent or erect, sparsely hispid or glabrous. *Leaves* long-petioled; leaflets broadly ovate, acute or obtuse, the lateral oblique at the base. *Racemes* few-flowered. *Flowers* small. *Pods* 1½ in., erect or ascending, tapering at both ends; pedicels ¼–¾ in.

4. **C. trifoliolata,** *H. f. & T. Journ Linn. Soc.* v. 145; succulent, leaflets subsessile 3-lobed, flowers pale lilac, funicles not winged. *Griff. It. Notes* 121, *No.* 259.

Mossy streams in the forests of BHOTAN, alt. 5500 ft., *Griffith.*

A small fleshy annual; rootstock short, creeping; stems 4–5 in., simple, erect. *Radical leaves* on long very slender petioles, leaflets small, rounded, sparsely hairy above, glabrous beneath, lobes obtusely pointed; cauline few, shortly petioled, some times simple. *Racemes* subcorymbose, few-flowered. *Sepals* small, obovate, glabrous, margin membranous. *Petals* ¼ in. long, obovate, scarcely clawed.

*** *Radical leaves (or all) pinnatisect.*

5. **C. subumbellata,** *Hook. mss.*; perennial, young parts with spreading hairs, leaflets petioled irregularly lobed and crenate, flowers small yellowish-white, pods irregularly corymbose narrow lanceolate acute few-seeded. C. hirsuta *var.* subumbellata, *Dalzell in Hook. Kew Journ. Bot.* 1852, 294. C. nilagirica, *Schlecht. in Herb. Hohenack. No.* 1493.

Shaded woods in the CONCAN, MALABAR, and CEYLON.

Slender, diffuse, very like *C. hirsuta* var. *sylvatica*, but young parts laxly strigose with spreading hairs, inflorescence corymbose, flowers more yellow, and pods broader. *Stem* 3–10 in., branching from the roots. *Leaflets* 3–6 by ¼–1½ in. *Pods* ¾–1 in., sometimes solitary and axillary, 6–10-seeded. *Seeds* broad-oblong, remote; funicle dilated.

6. **C. hirsuta,** *Linn.*, var. sylvatica, *Link.* (sp.); annual, glabrous, leaflets petioled, petioles not auricled, flowers small white, stamens 6, pods racemed erect acute or obtuse. C. hirsuta, *H. f. & T. in Journ. Linn. Soc.* v. 146; *Wall. Cat.* 4780. C. debilis, *Don Prodr.* 201.

All temperate regions of India; and a weed of the cold season in Bengal.—DISTRIB. General.

Stem suberect or decumbent, 3–12 in. *Leaflets* orbicular-ovate, toothed, and angled; of the upper leaves narrow. *Petals* narrow, erect, twice as long as the very small sepals. *Pods* ½–1 in.; style very short, except in var. *oxycarpa.*

VAR. *oxycarpa* (not *C. oxycarpa*, Boiss.); diffusely branched, pods acuminate, style slender.—Hilly districts, common.

7. **C. impatiens,** *Linn.*; annual, erect, glabrous, leaflets shortly petioled, petioles auricled, flowers small white, stamens 6, pods erect. *H. f. & T. Journ. Linn. Soc.* v. 146; *Griff. It. Notes* 218, *n.* 99. C. pectinata *DC. Syst. Veg.* ii. 264.

Temperate Himalaya from SIKKIM to KASHMIR, alt. 5–12,000 ft.—DISTRIB. Affghanistan, temp. Europe and Asia.

Stems stiff, 6–12 in. *Leaves* pinnate; leaflets small, ovate-oblong or lanceolate, obtusely 3–5-lobed; auricles of the stem-leaves sagittate. *Petals* linear, erect, very minute, white, often 0. *Pods* 1 in., erect, very slender, linear, acute; style subulate; valves smooth.

8. **C. pratensis,** *Linn.*; perennial, glabrous, leaflets in equidistant pairs angled shortly petioled, flowers large white or lilac, pods linear erect. *H. f. & T. Journ. Linn. Soc.* v. 145.

Hassora in WESTERN TIBET, *Winterbottom.*—DISTRIB. N. and W. Asia, Europe, Abyssinia, N. America.

Stem 1 ft.; rootstock sometimes bearing small fleshy tubers. *Leaves* pinnate; leaflets of the radical leaves orbicular or ovate, terminal larger: those of the cauline leaves linear-oblong, entire. *Flowers* corymbose when young. *Petals* spreading, three times as long as the sepals. *Pods* 1 in.; style short.

9. **C. Griffithii,** *H. f. & T. Journ. Linn. Soc.* v. 146; perennial, erect, leaflets sessile entire or sinuate, lowest pair at the base of the petiole, flowers large deep lilac. *Griff. Itin. Notes,* 188, n. 996.

Wet places near Lamu in Bhotan, *Griffith.*

Rootstock creeping; *stem* 1 ft., angled and grooved. *Leaflets* in 3–6 pairs, ovate oblong or rounded.—The specimens have no flowers, but Griffith has recorded their size and colour.

10. **C. elegantula,** *H. f. & T. Journ. Linn. Soc.* v. 146; very small, annual, branched, leaflets linear-oblong in 5–7 remote pairs, flowers white or rose, pods filiform. Hutchinsia sp. *Griff. It. Notes,* 195, n. 1079.

Wet rocks Chuka in Bhotan, alt. 6500 ft., *Griffith.*

Pale green, tender. *Stem* 2–3 in., slender. *Leaves* glabrous, pinnate; leaflets petiolulate, small, fleshy, linear-oblong, sublobed angled or quite entire. *Racemes* lengthened, 2–9-flowered. *Petals* white or rose, broadly clawed, thrice as long as the small glabrous sepals. *Pods* ¾ in., narrow-linear, on very slender, filiform, spreading or drooping pedicels; style short, a little narrower than the pods.

11. **C. macrophylla,** *Willd. Sp. Pl.* iii. 484; stout, erect, perennial, leaflets ovate or lanceolate crenate-lobed or pinnatifid, flowers large white or deep violet, pods with very thick margins. *DC. Prodr.* i. 152; *H. f. & T. Journ. Linn. Soc.* v. 145. C. polyphylla, *Don Prodr. Fl. Nep.* 201. Dentaria dasyloba, *Turcz. in Bull. Soc. Imp. Mosq.* xxx. n. 103.

Temperate Himalaya, alt. 7–12,000 ft., from Sikkim to Kashmir.—Distrib. N. Asia, Japan.

Leafy, glabrous or slightly pubescent; rootstock creeping; stem simple, herbaceous, 1–2½ ft., smooth, striated. *Leaves* all pinnate; leaflets ½–3 in., 3–5 pairs, acuminate or obtuse. *Racemes* erect, many-flowered. *Pods* ½–1½ in., erect, tapering at both ends; valves smooth, flat; style ⅙ in., rigid.

Var. 1. *dentariæfolia;* lateral leaflets lanceolate or ovate-lanceolate crenate or serrate obtuse, flowers large white or violet, pods ½–1¼ in.—C. macrophylla, *Led. Fl. Ross.* i. 128.—From Kumaon to Kashmir.

Var. 2. *foliosa;* lateral leaflets narrow-lanceolate acuminate subpinnatifid, flowers white, pods 1–1½ in. pale coloured—C. foliosa, *Wall. Cat.* 4779.—Kumaon and Kashmir. The smallest state of the species.

Var. 3. *lobata;* leaflets ovate-lanceolate irregularly and coarsely lobed or cut, lobes obtuse, flowers and pods as in var. *foliosa,* but the plant larger.—Kashmir, 6000 ft.; Western Tibet, 13,000 ft.

Var. 4. *sikkimensis;* tall and coarse, leaflets ovate-lanceolate obtusely serrate, flower large deep violet, pods large and broad 1¾ in. long pale brown.—Inner ranges of Sikkim, 7000–13,000 ft. (The Lepchas use the leaves and young stems of this variety as a pot-herb.)

?9. LOXOSTEMON, H. f. & T.

A diminutive tender annual, with a few petiolate, usually 3-foliolate, leaves. *Flowers* small, corymbose, lilac. *Sepals* spreading, equal at the base. *Petals* broadly spathulate, clawed. *Filaments* of the long stamens thickened at the tip and recurved. *Pod* linear; stigma sessile, 2-lobed.

Closely allied to *Cardamine,* but in the absence of ripe fruit its place cannot be determined with certainty.

1. **L. pulchellus,** *H. f. & T. Journ. Linn. Soc.* v. 147.

Sikkim, in moist grassy places, alt. 10–13,000 ft., *H. f.*

Stem slender, filiform, flexuous, glabrous, springing from a mass of toothed root-bulbils. *Leaves* generally 3-foliolate, rarely in 2 pairs; leaflets subsessile, linear, entire, apiculate. *Corymb* 3–6-flowered.

10. NOTOCERAS, Br.

A small, stiff, depressed, branched, hoary herb, with bipartite adpressed pubescence. *Flowers* white, in leaf-opposed racemes. *Sepals* equal at the base. *Petals* small, linear-oblong. *Pod* rigid, almost indehiscent, linear-oblong, terete; valves with a prominent keel prolonged at the tip into a horn; internally pitted opposite the seeds; style short; stigma capitate. *Seeds* 1-seriate, small, compressed, wingless; cotyledons accumbent.

1. **N. Canariense,** *Br. in Hort. Kew. ed.* 2, iv. 117; *Griff. Itin. Not.* 230, n. 225; *H. f. & T. Journ. Linn. Soc.* iv. 147. N. hispanicum, *DC.; Deless. Ic. Sel.* ii. t. 17.

Fields and sandy places in the PUNJAB, *Vicary*, &c.—DISTRIB. Westward to the Canary Islands.

Stems 6–8 in., spreading and branching from the base. *Leaves* linear-oblong, entire. *Racemes* short, many-flowered. *Sepals* covered with adpressed hairs. *Pods* ¼ in., subsessile, erect, hoary. *Seeds* 4–8.

11. FARSETIA, Desv.

Hoary or tomentose much branched twiggy undershrubs or herbs. *Leaves* small, linear-oblong, entire. *Flowers* white pink or yellow, spiked or racemed. *Sepals* erect, connivent, lateral saccate at the base. *Petals* with long claws *Pods* sessile, linear or elliptic, much flattened; valves convex, plane or with a midrib; septum membranous. *Seeds* 1–2-seriate, suborbicular, broadly winged; cotyledons accumbent.—DISTRIB. About 20 species, natives of S. Europe, W. Asia, and N. Africa.

1. **F. Jacquemontii,** *H. f. & T. Journ. Linn. Soc.* v. 148; flowers large, buds elliptic, sepals acute, pods narrow-linear. *Griff. Itin. Notes*, 218, n. 105.

Sandy places in the PUNJAB and SINDH.—DISTRIB. Affghanistan and Beluchistan.

An erect, rather rigid, hoary perennial, covered with closely adpressed hairs attached at their middle. *Stems* 12–18 in., branches virgate. *Leaves* ½–1 in., linear-oblong or linear. *Sepals* strigose. *Petals* half as long again as the sepals. *Pods* 1½–2 by ⅛–⅙ in., compressed; valves flat, nerveless or faintly 1-nerved; stigma short, suberect. *Seeds* 2-seriate—It is impossible to determine from Burman's figure whether this is the *Arabis heleophila*, DC.

2. **F. Hamiltonii,** *Royle Ill.* 71; flowers small, buds small subglobose, sepals obtuse. *H. f. & T. Journ. Linn. Soc.* v. 148. F. linearis, *Decaisne in Ann. Sc. Nat. Sér.* 2, xvii. 150; *Hook. Ic. Pl.* t. 808. Cheiranthus Farsetia, *Wall. Cat.* 4081. Arabis incanescens, *Munro, Plants of Agra*, 6.

Upper GANGETIC PLAIN and the PUNJAB, from Agra Westwards.—DISTRIB. Affghanistan, Arabia, Algeria.

More rigid and woody than *F. Jacquemontii*, covered with denser and finer closely adpressed pubescence; branches long, erect, virgate. *Leaves* linear, very narrow. *Flowers* in long spicate racemes. *Sepals* strigose, margins scarious. *Petals* obovate, a little longer than the sepals, pink. *Pod* ½–1 by $\frac{1}{20}$ in., linear; valves almost nerveless; septum transparent; style slender. *Seeds* 1-seriate.—Closely allied to *F. longisiliqua*, Dcne., of Egypt and Arabia, but has smaller flowers and shorter pods. *F. linearis*, Dcne., is certainly identical with the Indian plant although the Algerian specimens have a slightly longer style, and a more 2-lobed stigma.

3. **F. ægyptiaca,** *Turr. diss. Fars.* i. t. 1, *ex DC. Syst.* ii. 287; flowers large, buds cylindric, sepals obtuse, pod elliptic-oblong. *H. f. & T. Journ.*

Linn. Soc. v. 147; *Griff. Itin. Notes,* 366, n. 11. F. ovalis, *Boiss. Diag.* viii. 32. F. Edgeworthii, *H. f. & T. Journ. Linn. Soc.* v. 147.

PUNJAB, in the Salt range, *Edgeworth*, &c.—DISTRIB. Affghanistan, Arabia, N. Africa.

A rigid, hoary undershrub, with forked virgate branches. *Leaves* linear. *Flowers* spicate, distant. *Calyx* cylindrical. *Sepals* ¼–⅓ in., hoary. *Petals* linear, obtuse, twice as long as the sepals. *Pods* ½–¾ by ⅕–¼ in., erect, broad, elliptic-oblong; valves flat, midrib indistinct or sometimes prominent; style very short. *Seeds* usually 2-seriate.

12. **ALYSSUM,** Linn.

Small branching herbs or undershrubs, often rigid, pubescent, hoary, stellate or scaly. *Leaves* linear, entire. *Flowers* small, yellow or white, in ebracteate racemes. *Sepals* short, erect or spreading, equal at the base. *Petals* with short claws, entire or 2-fid. *Filaments* often winged or with tooth-like appendages. *Pods* short, flattened parallel to the septum or turgid, orbicular elliptic ovate obovate or oblong; valves flat or concave or convex in the centre and flat at the margin; septum membranous, entire or perforated; style varying in length. *Seeds* 2–10, flattened; cotyledons accumbent.—DISTRIB. Species about 90, natives of S. Europe, Central Asia, and Southern Siberia.

Alyssum (*Kœniga*) *maritimum* is cultivated in gardens in N.-W. India.

1. **A. minimum,** *Willd. Sp. Pl.* iii. 464; leaves linear-oblong or obovate, filaments winged, valve of pod tumid in the centre. *Boiss. Fl. Orient.* i. 281; *H. f. & T. Journ. Linn. Soc.* v. 148.

KASHMIR, alt. 4–6000 ft., *T. T.*—DISTRIB. Affghanistan, W. Asia, S. Europe.

A hoary herb, with numerous stiff stems or branches 6–8 in. long, spreading from the base, ascending, everywhere except the petals and pods covered with stellate hairs or scales. *Racemes* many-flowered, lengthening during flowering. *Petals* minute, linear, white or faintly yellow. *Filaments* with entire or toothed wings. *Pods* as long as their pedicels, orbicular, slightly notched, glabrous; style very short, acute.

2. **A. canescens,** *DC. Prodr.* i. 164; leaves narrow-linear, filaments not winged, valve of pod flat. *H. f. & T. Journ. Linn. Soc.* v. 149. A. tenuifolium, *DC. Syst.* ii. 322. Pilotrichum canescens *and* elongatum, *C. A. Mey. in Led. Fl. Alt.* iii. 66; *Ic. Pl. Ross.* t. 273.

Western Himalaya in KUMAON, and WESTERN TIBET, alt. 14–17,000 ft.; *T. T.*, &c.—DISTRIB. S. Siberia.

A small, very hoary, tomentose plant; woody stems short tufted. *Leaves* 1 in., densely tufted, obtuse, erect. *Racemes* corymbose, elongating in the fruit. *Petals* orbicular-obovate, twice as long as the sepals, white. *Pods* ⅙ in., erect, on short filiform pedicels, ovate, tomentose; style slender, half the length of the pod; stigma capitate. *Seeds* 2, not margined.

13. **DRABA,** Linn.

Small tufted herbs with stellate pubescence. *Leaves* entire, radical rosulate. *Flowers* white or yellow, rarely purple, in short ebracteate racemes, or corymbs. *Sepals* short, equal at the base. *Petals* entire or emarginate, claws short. *Filaments* simple. *Pods* compressed or turgid, elliptic oblong or ovoid, rarely linear; valves flat, rarely convex; septum membranous; style short or long. *Seeds* 2-seriate, ovoid, compressed, not margined; cotyledons accumbent, rarely incumbent.—DISTRIB. Species about 80, natives of N. temp., arctic, and alpine regions, and of the Andes of S. America.

Sect. I. **Aizopsis.** *Rootstock* stout, with many crowded tufts of rosulate leaves, which are rigid, ciliate, with a stout midrib beneath.

1. **D. glacialis,** *Adams in Mem. Soc. Nat. Mosq.* v. 106; leaves linear, scapes naked, flowers yellow, pods twisted, style distinct. *DC. Prodr.* i. 167; *H.f. & T. Journ. Linn. Soc.* v. 150. D. setosa, *Royle Ill.* 71. D. elegans, *Boiss. Fl. Orient.* i. 300.

Western Tibet and Kunawar, alt. 10–15,000 ft.—Distrib. Arctic Asia and America, Soongaria, Rocky Mts.

Root slender, woody; branches many, prostrate, tufted, covered below with withered leaves. *Leaves* densely tufted, rather rigid, entire, rough and ciliated. *Scapes* 1–5 in., numerous. erect, stiff. *Flowers* crowded near the summit of the scape. *Pedicels* and *calyx* 'glabrous. *Pods* $\frac{1}{8}$–$\frac{1}{3}$ in., erect, ovate-lanceolate, acute, glabrous.—Scarcely distinct from *D. alpina*, L.

Sect. II. **Chrysodraba.** *Root* or *rootstock* stout, with many crowded tufts of leaves. *Leaves* not rigid, without a strong midrib beneath, setose or tomentose. *Flowers* yellow.

2. **D. alpina,** *Linn.*; perennial, leaves densely rosulate oblong spathulate or lanceolate, scape leafless or 1-leaved, pods elliptic glabrous straight. *H.f. & T. Journ. Linn. Soc.* v. 150. D. radicans, *Royle Ill.* 71. D. alpicola, *Klotzsch in Reise Pr. Waldem.* 128, t. 36, f. 1 (bad). (D. algida, *Adams;* Adamsii, *Led.*; ochroleuca, *Bunge;* polytricha, *Led.*)

Alpine Himalaya from Sikkim to Kashmir and in Western Tibet, alt. 12–17,000 ft. —Distrib. Alps of W. Asia, N. Europe, the Rocky Mts. and Arctic regions.

Stems densely tufted, short or 6–10 in. *Leaves* $\frac{1}{4}$–1 in., covered with mixed simple and branched hairs, or glabrous with ciliate margins. *Scapes* $\frac{1}{6}$–6 in., 1–10-flowered. *Flowers* rather large, subcapitate. *Sepals* usually glabrous. *Pods* $\frac{1}{6}$–$\frac{1}{4}$ in., shortly racemose, 4–10-seeded; pedicels suberect, hairy or glabrous, long; style very short.

3. **D. elata,** *H.f. & T. Journ. Linn. Soc.* v. 150: annual, leaves loosely rosulate spathulate obtuse, scapes with distant leaves, pods ovate- or oblong-lanceolate acute twisted.

Subalpine inner ranges of Sikkim, alt. 11–13,000 ft., *H.f.*

Erect, 9–15 in., sparingly covered with simple and stellate hairs. *Radical leaves* petioled, entire or rarely toothed. *Flowers* numerous, subcapitate. *Sepals* $\frac{3}{4}$ in., hairy, margin scarious. *Petals* twice as long, ovate-oblong, clawed. *Pods* in long lax racemes, once or twice twisted, glabrous when ripe; pedicels $\frac{1}{2}$ in., spreading or suberect, pilose, lower often bracteate.

4. **D. incompta,** *Steven in Bull. Soc. Nat. Hist. Mosc.* iii. 268; perennial, leaves rosulate oblong, scapes naked, pod elliptic-oblong slightly curved not twisted. *DC. Prodr.* i. 168; *Deless. Ic.* ii. 44; D. tibetica, *var.* γ Winterbottomi, *H.f. & T. in Journ. Linn. Soc.* v. 152.

Western Tibet, alt. 11–13,000ft., *Falconer, Winterbottom.*—Distrib. Persia, Caucasus.

A small very tomentose, hoary plant, with short naked branches from the crown of the root, ending in tufts of leaves. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., all tufted, oblong. *Scapes* $\frac{1}{4}$–$\frac{1}{2}$ in., pubescent, scarcely lengthening in fruit. *Pods* glabrous; style short, bent or straight. —The fruit of this plant was unknown when it was referred as a variety to *D. tibetica;* those of Falconer's specimens recently added to the Kew Herbarium have ripe pods, which are similar to those of the Persian and Caucasian plant.

Sect. IV. **Leucodraba.** *Rootstock* biennial or perennial, with many tufts of radical leaves. *Leaves* soft, flat. *Flowers* white.

5. **D. incana,** *Linn.; DC. Prodr.* i. 170; stem leafy rarely branched, leaves usually toothed, pods elliptic-lanceolate acute hoary longer than their pedicel. *Reich. Ic. Fl. Germ.* t. 14; *H. f. & T. in Journ. Linn. Soc.* v. 151. D. himalayensis, *Klotzsch in Bot. Reis. Pr. Wald.* 127, t. 34 B (bad). (D. confusa, *Ehr.*; gracilis, *Led.*)

Alpine Himalaya, from Sikkim to Western Tibet, alt. 10–17,000 ft.—Distrib. Alpine and arctic N. Europe, Asia and America, Fuegia.

Hoary. *Stems* 1–10 in., erect. *Radical leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., loosely tufted or spreading, elliptic or oblong-lanceolate or narrow-spathulate; cauline distant, sessile, ovate- or oblong-lanceolate, toothed or rarely entire. *Flowers* small, white. *Petals* twice the length of the sepals, obovate, notched. *Pods* racemed, compressed, sometimes twisted, tomentose; pedicels $\frac{1}{6}$–$\frac{1}{4}$ in., erect, pubescent; stigma subsessile.

The Tibetan and Himalayan specimens possess the characters of *D. confusa*, Ehr., usually having toothed cauline leaves, and stellately pubescent pods.

6. **D. lasiophylla,** *Royle Ill.* p. 71; stem sparsely leafy, radical leaves crowded soft white, pods elliptic-lanceolate much twisted shorter and broader than in *D. incana*. *Boiss. Fl. Orient.* i. 301; *H. f. & T. Journ. Linn. Soc.* v. 151. D. glomerata, *Royle Ill.* 71.

Alpine Himalaya and Western Tibet, from Sikkim to Kunawur and Ladak, alt. 12–18,000 ft.—Distrib. Turkistan.

Very like the preceding, but more hairy, and with shorter less leafy stems, and leaves in closer tufts. *Radical leaves* $\frac{1}{6}$–$\frac{1}{2}$ in., oval-oblong or oblong-lanceolate. *Stems* simple, erect, with 1–3 sessile lanceolate leaves. *Flowers* small, white, subcapitate. *Fruiting racemes* elongate or subcapitate; pedicels very short. *Pods* once to three times twisted.—Very closely allied to *D. stellata*, Jacq., of the European Alps (*D. siliquosa*, M. A. B., is probably identical), scarcely differing except in the twisted pod.

7. **D. fladnitzensis,** *Wulf. in Jacq. Misc.* i. 147, and 17, f. 1; small, glabrous or pilose, leaves densely rosulate lanceolate, scape slender leafless or 1-leaved, pods elliptic-oblong or lanceolate straight glabrous. *DC. Prodr.* i. 169; *Reich. Ic. Fl. Germ.* xiii. f. 4237. D. Wahlenbergii, *Hartm. Scand.* ed. i. 249; *H. f. & T. Journ. Linn. Soc.* v. 151 (D. helvetica, *Schleich*; lapponica, *Wahl.*; androsacea, *Willd.*).

Western Himalaya in Kumaon and Kunawur, and in Western Tibet, alt. 13–18,000 ft.—Distrib. Alpine and arctic Europe, Asia and America.

Leaves $\frac{1}{6}$–$\frac{1}{2}$ in., margins ciliate. *Scapes* 1–4 in., erect. *Flowers* few, capitate. *Petals* short, scarcely clawed, white. *Pods* scarcely racemed; style very short.—"We have adopted the first name given to this species, which is that of the Carpathian plant, with which the Indian quite agrees," *T. Anderson*.

Var. 1. *homotricha*; leaves stiffly ciliate glabrous or with simple hairs. D. Wahlenbergii, *var.* homotricha, *Led. Fl. Ross.* i. 150; *H. f. & T. l.c.* 151 (D. lactea, *Kar. & Kir.*; D. altaica, *Bunge*).—S. Piti and Nubra.

Var. 2. *heterotricha*; leaves with mixed simple and stellate hairs. *D. Wahlenbergii*, var. *heterotricha*, Led. Fl. Ross. i. 150; *D. pygmea*, Turc.

8. **D. tibetica,** *H. f. & T. Journ. Linn. Soc.* v. 152; loosely tufted, woolly or hoary, leaves spathulate-lanceolate entire, scapes slender usually leafless, pods hoary shorter than their slender pedicels.

Inner ranges of the Sikkim Himalaya, and Western Tibet; alt. 13–15,000 ft.

Leaves $\frac{1}{4}$–1 in., nearly all radical, entire. *Scapes* 3–8 in., numerous, erect, flexuose, rarely with 1 or 2 sessile lanceolate leaves. *Flowers* subcapitate, rather large, white; pedicels $\frac{1}{2}$–1 in., slender, erect. *Pods* $\frac{1}{6}$–$\frac{1}{3}$ in. long, racemed, elliptic or linear-lanceolate, flat or twisted; style very variable in length.—Both the following varieties (especially the first) are too closely allied to *D. lasiophylla* and *D. incana*.

VAR. 1. *Thomsonii,* H. f. & T. l.c.; leaves laxly or scarcely tufted hoary and tomentose, pods linear-lanceolate not twisted, style short and stout—Zanskar, *Thomson.*

VAR. 2. *sikkimensis,* H. f. & T. l.c.; leaves closely tufted except in very luxuriant young shoots very woolly, pods long linear-lanceolate or short and elliptic twisted, style long slender.—Sikkim at 16,000 ft., *H. f.*

SECT. IV. **Drabella.** Annual. *Scapes* or *stems* leafy. *Flowers* white or yellow.

9. **D. muralis,** *Linn.;* stellately hispid, stems filiform flexuous, cauline leaves broad elliptic-ovate coarsely toothed, petals white minute, fruiting racemes very long, pods horizontal oblong or elliptic on long capillary spreading pedicels. *Boiss. Fl. Orient.* i. 302.

KASHMIR, alt. 5600 ft.—DISTRIB. Asia Minor, N. Africa, Europe.

An erect, simple or branched very slender annual; rather rough with short simple or forked hairs. *Radical leaves* ¼–½ in., few, rosulate, obovate, entire or toothed; cauline few, sessile, auricled or not. *Flowers* in a short raceme. *Petals* small, narrow, entire, white. *Pods* racemed, ⅓–½ in., quite flat, glabrous or scaberulous, stigma subsessile. *Seeds* about 12.

10. **D. ellipsoidea,** *H. f. & T. in Journ. Linn. Soc.* v. 153; stems flexuous prostrate short interlaced, leaves toothed, flowers minute white, fruiting racemes very short, flowers minute white, pods elliptic-oblong very flat obtuse, stigma sessile.

SIKKIM-HIMALAYA, a weed in radish fields, alt. 15–16,000 ft., *H. f.*

Much depressed, hairy, leafy *Leaves* ¼–1 in., linear-oblong. *Pods* racemed, ⅙–⅓ in., equalling or shorter than their curved pedicels, flat, stellately pubescent; style 0.—Differs remarkably from *D. muralis* in its habit, flexuous branches, and short fruiting racemes.

11. **D. linearis,** *Boiss. in Ann. Sc. Nat. Sér.* 2, xvii. 167; *Fl. Orient.* i. 203; stem simple erect, leaves entire or nearly so, flowers rather large white, fruiting racemes long, pods erect linear. D. stenocarpa, *H. f. & T. Journ. Linn. Soc.* v. 153.

Das Kirim in temperate WESTERN TIBET, *Winterbottom.*—DISTRIB. Mountains of Persia.

Stem 6–12 in., scaberulous. *Radical leaves* rosulate, linear-oblong or obovate, thickly clothed with forked hairs; cauline 2–5. *Petals* narrow-cuneate, entire. *Pods* ⅓–⅔ in., in long racemes, on slender smooth ascending pedicels, tapering at both ends, straight; stigma sessile. *Seeds* many.—Near *D. muralis* but stiffer, with much longer and racemed pods.

12. **D. gracillima,** *H. f. & T. Journ. Linn. Soc.* v. 153; hoary, scapes or stems many weak ascending, leaves subentire, flowers small yellow, racemes long, pods linear erect.

Temperate SIKKIM-HIMALAYA, alt. 10–13,000 ft., *H. f.*

Stems 4–12 in. *Radical* leaves spreading, spathulate; cauline few, near the base, sessile, ovate. *Scapes* numerous, filiform, flexuose. *Pods* ½ in., erect, tapering at both ends, compressed, straight or curved, glabrous; racemes occupying almost the whole length of the stem; pedicels ½ in., filiform, spreading or deflexed, the lowest often twice the length of the uppermost. *Seeds* numerous.

14. **EROPHILA,** DC.

Small, delicate annuals, with entire spreading root-leaves. *Flowers* usually small, white, on slender scapes. *Sepals* erect, equal at the base. *Petals* obovate, 2-fid. *Filaments* free, without appendages. *Pod* oblong, elliptic or linear, compressed; valves membranous, flat or convex; septum membranous; style very short. *Seeds* numerous, small, 2-seriate; funicles filiform.—DISTRIB. Species 5, European and W. Asiatic.

1. **E. vulgaris,** *DC.* Draba verna, *Linn.*; *H. f. & T. in Journ. Linn. Soc.* v. 149; *Griff. Itin. Notes* 239, No. 312; 243, No. 364; 365, No. 7; *Ic.* iv. t. 611.

KASHMIR; alt. 5–6000 ft.—DISTRIB. Affghanistan, W. Asia, Europe.

Leaves all radical, spreading on the ground, ovate or oblong, entire or toothed, slightly hairy. *Scapes* 2–8 in., erect, glabrous. *Pods* $\frac{1}{5}$ in., elliptic-oblong, at least twice as long as broad; pedicels long, slender.

15. **COCHLEARIA,** Linn.

Glabrous, often fleshy annual or perennial herbs. *Leaves* entire or pinnatipartite. *Flowers* white, rarely yellow or violet, corymbose or in short racemes, rarely solitary on scapes. *Sepals* spreading, equal at the base. *Petals* entire, shortly clawed. *Filaments* without appendages or teeth. *Pods* globose ovoid or oblong; valves convex, turgid. *Seeds* 2-seriate, rarely 1-seriate, compressed, without wings; cotyledons accumbent.—DISTRIB. Species about 25, natives of N. temp. and Asiatic regions.

1. **C. flava,** *Ham. Hort. Bengh.* 48; annual, diffusely branched, leaves pinnatifid, pods globose. *Hook. Ic. Pl.* t. 805; *H. f. & T. Journ. Linn. Soc.* v. 154. C. alyssoides, *DC Prodr.* i. 172. Camelina Caisir, *Wall. Cat.* 4802. Alyssum cochlearioides, *Roth.*

Upper and lower GANGETIC valleys, from the Soane westwards to KURNAUL.

Erect, rarely depressed, glabrous, 1 ft. high. *Root* long, fusiform. *Leaves* 4–5 in., lanceolate, lobes sinuate-toothed, lower petioled, upper smaller shorter petioled, auricled. *Racemes* numerous, long. *Flowers* small, yellow; pedicels $\frac{1}{16}$ in. *Pods* smooth, about $\frac{1}{8}$ in. diam.; valves membranous, hemispheric, nerveless; style short, thick. *Seeds* small, numerous, rugose, funicles filiform.

2. **C. himalaica,** *H. f. & T. Journ. Linn. Soc.* v. 154; small, prostrate, leaves long-petioled oblong-ovate, flowers racemed, pod elliptic.

Inner ranges of the SIKKIM-HIMALAYA, alt. 14–16,000 ft., *H. f.*

A dwarf, prostrate, smooth, leafy, fleshy annual?, with long fusiform slender root. *Leaves* coarsely toothed. *Flowers* small, in short bracteate racemes. *Sepals* persistent, slightly hairy. *Pods* slightly compressed, bent, pubescent, 3–5 seeded; valves thin, membranous; septum disappearing in the ripe fruit.—*Cochlearia altaica* (*Taphrospermum altaicum*, C.A.M.) very closely resembles this, but differs in the shape [illegible] the leaves, pods and seeds.

3. **C. scapiflora,** *H. f. & T. in Journ. Linn. Soc.* v. 154; stemless, rootstock very stout, leaves linear-lanceolate or spathulate, scapes 1-flowered, pods obliquely elliptic-oblong.

By melting snow-rills in the SIKKIM-HIMALAYA, *H. f.*, and in WESTERN TIBET, alt. 15–18,000 ft., *Strach. & Wintert.*,

Small, stemless, fleshy, glabrous. *Leaves* tapering at the base into a long flat *petiole*, entire or with a few broad sharp teeth. *Scapes* 1$\frac{1}{2}$ in., flaccid. *Flowers* large, pale lilac. *Sepals* glabrous, persistent. *Pods* $\frac{1}{6}$–$\frac{1}{4}$ in. long; *septum* evanescent.

16. **MALCOLMIA**, Br.

Branching herbs, pubescence simple or stellate. *Leaves* entire or pinnatifid. *Flowers* in lax racemes, white or purple. *Sepals* erect, equal at the base. *Petals* linear, claws long. *Filaments* free, the longer ones sometimes united in pairs. *Pods* elongate, cylindric, hard and dehiscing late; peduncle usually thickened; valves 3-nerved; septum membranous; stigma erect, lobes often united into an acute cone or decurrent along the short style. *Seeds* 2-seriate towards the base of the pod, oblong, not margined; cotyledons incumbent.—Distrib. About 20 species, natives of W. Asia and the Mediterranean region.

* *Pods linear, elongate.*

1. **M. africana,** *Br. Hort. Kew. ed.* 2, iv. 121; leaves oblong or lanceolate toothed, flowers many small, pods straight hispid. *DC. Prodr.* i. 187; *Griffith Itin. Notes* 260, No. 513; *H. f. & T. in Journ. Linn. Soc.* v. 155.

Fields and waste places in the Punjab, Kashmir, and Western Tibet, ascending to 13,000 ft.—Distrib. W. Asia, Mediterranean region.

Stout, leafy, annual, $1\frac{1}{2}$ ft., rough with stiff forked and simple hairs; branches many, long, somewhat spreading. *Leaves* 1–6 in., petioled. *Flowers* near the ends of the branches. *Petals* obovate-oblong, twice as long as the persistent sepals, purple or white. *Fruiting racemes* 6–12 in. long; pedicels $\frac{1}{12}$ in., erect, as thick as the pods. *Pods* 2–3 in. long, narrow, linear, very rough with short forked hairs; valves prolonged into a short blunt horn; stigma short, conical, tapering to an acute point.—Varies greatly in pubescence, size of the leaves, and length and thickness of the pedicels and pods.—A very rough variety with small flowers has been distinguished as β *stenopetala* (*M. stenopetala*, Led.).

2. **M. torulosa,** *Boiss. Fl. Orient.* i. 225; leaves narrow toothed or pinnatifid, flowers small, pods torulose usually contorted or recurved. Sisymbrium torulosum, *Desf. Fl. Atlant.* ii. 84, t. 159; *DC. Prodr.* i. 195; *H. f. & T. in Journ. Linn. Soc.* v. 163. S. contortuplicatum, *DC. Prodr. l.c.*

Punjab at Peshawur, *Stewart.*—Distrib. Westwards to Syria and N. Africa.

A depressed annual or biennial, with numerous spreading and ascending stiff, stout branches, 6 or 8 in. long, hispid with stiff spreading simple or forked hairs, rarely glabrous. *Radical leaves* 1–3 in., numerous, oblong-lanceolate, acute; cauline shorter and less divided. *Flowers* small, subsessile, white. *Pods* $\frac{3}{4}$–1 in., on very short thick pedicels, slender, straight recurved or contorted, hispid. *Seeds* small, oblong, 1-seriate.

** *Pods long or short, subulate.*

3. **M. strigosa,** *Boiss. Fl. Orient.* i. 224; glabrous or hispid below only, leaves oblong-lanceolate repand or toothed, pods 1–$1\frac{1}{2}$ in. long.—*H. f. & T. in Journ. Linn. Soc.* v. 155.

In the Salt range, Punjab, *Fleming, Stewart.*—Distrib. Affghanistan, Beluchistan, Persia.

A stout, depressed or suberect, rough, hairy annual, soon dividing into a few rather rigid short branches 6–18 in. long. *Radical leaves* long-petioled, spreading on the ground, 2 or 3 in. long; cauline shorter and more entire. *Flowers* numerous, sessile, in racemes 2–12 in. *Petals* about $\frac{1}{2}$ in., sometimes twisted, linear, dark purple, rarely white, limb broader than the claw. *Pods* terete, stout, thickened at the base, tapering to an obtuse point, spreading horizontally or decurved; base with short branching and long spreading forked hairs, less hispid above. *Seeds* sub-2-seriate at the base of the pod, 1-seriate above.

17. **LEPIDOSTEMON,** H. f. & T.

A dwarf annual with a short leafy unbranched stem. *Leaves* narrow, toothed. *Flowers* yellow, on long subcorymbose pedicels. *Sepals* short, equal at the base. *Stamens* free ; all the filaments with a broad appendage. *Pods* linear, elongate ; valves smooth ; septum entire, hyaline, nerveless ; style very short ; stigma 2-lobed. *Seeds* 1-seriate, oblong, flattened, with long slender free cords.

1. **L. pedunculosus,** *H. f. & T. in Journ. Linn. Soc.* v. 156.

Interior valleys of Sikkim-Himalaya ; rocky hills at Tungu, alt. 14–15,000 ft., *H. f.*

A dwarf alpine of peculiar habit, 1 in. high, covered with soft forked hairs. *Stem* erect, simple. *Leaves* numerous, ¼–1½ in., oblong or narrowly spathulate, deeply sharply toothed. *Flowers* numerous, rather large, subcorymbose ; pedicels ¾ in., erect, downy. *Sepals* erect, pilose, persistent. *Petals* short, obovate, emarginate. *Pods* ½ in. (immature) erect, downy. Seeds unknown ; affinity hence doubtful.

18. **SISYMBRIUM,** Linn.

Glabrous hairy or tomentose or hoary annual or biennial herbs. *Leaves* entire lobed pinnatifid or pinnatisect. *Flowers* yellow, white or rose-coloured, in lax often bracteate racemes. *Sepals* short or elongate, equal at the base or the lateral saccate. *Petals* with long claws. *Stamens* free; filaments all simple. *Pods* elongate, cylindric or compressed, rarely tetragonal ; valves convex, usually 3-nerved ; septum membranous ; style short, stigma 2-lobed. *Seeds* generally numerous, 1-seriate, not margined, with filiform cords ; cotyledons incumbent.—Distrib. Species about 80, chiefly European and Oriental, with a few representatives in most temperate regions.

Sect. I. **Arabidopsis.** *Flowers* white purple or rose-coloured. *Valves* of the terete or compressed pod 1-nerved or nerveless.—(Distinguishable from Arabis by the cotyledons only.)

* *Cauline leaves sagittate.*

1. **S. mollissimum,** *C. A. Mey. in Led. Fl. Alt.* iii. 140 ; glabrous or hairy, leaves entire or toothed, flowers capitate ebracteate, pods slender erect glabrous, pedicels slender. *Led. Ic. Fl. Ross.* t. 262 ; *H. f. & T. Journ. Linn. Soc.* v. 160.

Temperate Himalaya, from Sikkim to Kashmir, alt. 8–10,000 ft. (to 16,000 in Sikkim) ; Western Tibet, alt. 12–14,000 ft.—Distrib. Altai.

An erect rigid biennial or perenial. *Stem* solitary or 2 or 3 from the same root, 9–18 in. high, simple or with a few stiff erect branches. *Leaves* 1–2 in., shortly petioled, obovate-lanceolate ; cauline oblong, sagittate and stem-clasping, gradually smaller upwards. *Flowers* purple or white, racemes elongate and lax in the fruit ; pedicels slender, erect, ¼–½ in. *Pods* 1–1½ in., straight ; valves convex ; veins indistinct ; style short, slender.

Var. *glaberrima ;* all parts glabrous or only the lower part of the stem puberulous.—Western Himalaya, *Thomson ;* Western Tibet, *Falconer.*

2. **S. himalaicum,** *H. f. & T. Journ. Linn. Soc.* v. 160 ; hispidly tomentose, leaves sinuate-toothed, flowers racemed bracteate, pods erect or spreading glabrous or pubescent.

Temperate Himalaya, from Sikkim to Kashmir, alt. 10–12,000 ft.

Like the preceding, but smaller and more branched, hirsute, with mixed simple and stellate hairs. *Stem* erect, with numerous spreading or ascending stiff branches. *Leaves* radical petioled; upper clasping the stem by sagittate auricles. *Pods* 1–1½ in. long, terete, straight; pedicels short, stout, spreading, each with a leaf-like bract at the base; valves striate.

3. **S. foliosum,** *H. f. & T. in Journ. Linn. Soc.* v. 160; sparsely hairy, leaves broad toothed, flowers racemed glabrous, pods slender curved glabrous much compressed.

KASHMIR, alt. 5–7000 ft., *Thomson.*

A suberect or decumbent herbaceous much branched annual, with scattered stellate hairs, 6–12 in. high. *Radical leaves* soon withering, spathulate, shortly petioled; cauline larger, 1–2½ in. long, oblong or obovate, sessile, auricles long sagittate stem-clasping, coarsely toothed. *Flowers* small, white, ebracteate; pedicels ¼ in., slender, usually spreading, sometimes ascending or deflexed. *Pods* 1¼ in., in long racemes, spreading, ascending or the lower sometimes deflexed, straight or curved, with a few stellate hairs; valves thin, flattened, striate.

** *Leaves not pinnatifid; cauline not sagittate or auricled.*

4. **S. Thalianum,** *Gay & Monn. in Gaud. Fl. Helv.* iv. 348; annual, radical leaves petioled obovate, flowers small white, pedicels very slender, pods very slender suberect curved glabrous compressed, seeds flattened. *Boiss. Fl. Orient.* i. 214; *H. f. & T. Journ. Linn. Soc.* v. 163. Arabis Thaliana, *Linn.; DC. Prodr.* i. 144; Conringia Thaliana, *Reich. Ic. Fl. Germ.* t. 60, f. 4380.

Temperate Himalaya, from BHOTAN to KASHMIR, and in WESTERN TIBET; alt. 5–10,000 ft.; PUNJAB, *Stewart.*—DISTRIB. Temp. Europe, Asia, Abyssinia.

An erect, slender, branching annual, 4–12 in. high, slightly hispid with scattered spreading simple and forked hairs or glabrous. *Leaves* 1–3 in., toothed or entire; cauline few, remote, sessile, generally entire, *Racemes* slender, elongate; pedicels ¼–½ in., spreading or ascending. *Pods* ⅓–1 in., narrow linear; valves convex, 1-nerved; style short. *Seeds* very small; cotyledons obliquely incumbent.

5. **S. lasiocarpum,** *H. f. & T. Journ. Linn. Soc.* v. 163; annual, slender, erect, hispidly pubescent, leaves small radical obovate-spathulate, flowers lilac, pedicels short, pods short straight terete densely pubescent. *Griffith Itin. Notes* 188, No. 991.

Lammoo and Panya in BHOTAN, *Griffith.*

Simple, rigid, 9–18 in., hoary and pubescent with mixed simple and stellate hairs. *Radical leaves* ¼–1 in. long, few, shortly petioled, sinuate-toothed; cauline small, sessile, obovate. *Flowers* small. *Sepals* pubescent. *Pods* ¾ in., erect; valves convex, nerveless; style very short.

6. **S. rupestre,** *Edgew. in Trans. Linn. Soc.* xx. 33; annual, erect, branched, hoary, radical leaves linear-oblong sinuate-toothed, cauline sometimes cordate at the base, flowers shortly pedicelled, pods subterete glabrous or puberulous, slender. *H. f. & T. in Journ. Linn. Soc.* v. 162.

In the dry region of the WESTERN HIMALAYA, from Kumaon to Kashmir, alt. 8–14,000 ft.; Piti in WESTERN TIBET, *Thomson.*

Stem 6–18 in., stiff, branching; hairs forked, with a few scattered stellate ones. *Radical leaves* shortly petioled, ½–1 in.; cauline sessile, entire or toothed. *Racemes* few-flowered, bracteate throughout or towards the base; fruiting elongate, lax. *Flowers* purple or white. *Sepals* pubescent; pedicels $\frac{1}{12}$–$\frac{1}{6}$ in., puberulous. *Pods* 1½–1⅔ in., erect or spreading, compressed; valves with an indistinct central vein.

7. **S. humile,** *C. A. Mey. in Led. Fl. Alt.* iii. 137; perennial, dwarf, hoary, diffuse, radical leaves oblong, cauline petioled, flowers shortly pedi-

celled, pods straight terete torulose. *Led. Ic. Fl. Ross.* t. 147; *H. f. & T. Journ. Linn. Soc.* v. 163.

Western Tibet, alt. 12–15,000 ft., *Winterbottom*, &c.—Distrib. Siberia, arctic America.

Subhispid, hoary, rarely green and glabrous; rootstock woody. Stem 1–8 in., decumbent or ascending, simple or branched. *Radical leaves* ¼–1 in., many, crowded, sinuate-toothed or entire, cauline small. *Flowers* rather large, white or lilac. *Sepals* erect, pubescent or glabrous. *Pods* ½–1 in., pedicels short erect, cylindric, subhispid or glabrous, veins obscure.

8. **S. strictum,** *H. f. & T. Journ. Linn. Soc.* v. 161; annual, erect, hoary, leaves linear-oblong sinuate-toothed, cauline sessile, pedicels slender, pods erect curved terete slender glabrous, valves costate. Malcolmia stricta, *Camb. in Jacq. Voy. Bot.* i. 16, t. 16.

Western Himalaya, from Kumaon to Kashmir, alt. 5–10,000 ft.; Western Tibet, *Winterbottom*, *Falconer*.

Stem 9–24 in., simple, rigid, scabrous. *Leaves* 1–1½ in. long, lower narrowed into a short petiole; upper gradually diminishing along the stem, lanceolate, subentire. *Racemes* at first dense, elongate and lax in fruit. *Flowers* small, pale rose-coloured. *Pods* 1–2 in., narrow, on spreading or ascending pubescent pedicels ½ in. long; valves convex, with a prominent midrib; style short, tapering.

9. **S. axillare,** *H. f. & T. Journ. Linn. Soc.* v. 162; small, annual, depressed, leafy, radical leaves spathulate lobed or toothed, cauline sessile, flowers white bracteate, pedicles slender, pods very slender, valves nerveless. *Griff. Itin. Notes* 195, No. 1074.

Bhotan, on dry rocks and walls near Chupcha, alt. 8000 ft., *Griffith*; inner ranges of Sikkim, alt. 8–10,000 ft., *H. f.*

Diffuse, slender, subhispid or tomentose, branches prostrate leafy 3–6 in. long. *Radical leaves* shortly petioled, 1 in. long; cauline ¼–¾ in., ovate or oblong, rounded at the tip. *Flowers* rather large, solitary in the axils of the upper leaves; fruiting raceme elongate, lax, leafy; pedicels long, spreading or ascending. *Pods* ¼ in., terete, straight or slightly curved; subtorulose.—The Bhotan and Sikkim specimens agree in all essential characters, but the Bhotan ones from growing in a dry situation are smaller and much more hoary than those from Sikkim, where they were found in shady forests.

*** *Leaves pinnatifid.*

10. **S. Wallichii,** *H. f. & T. Journ. Linn. Soc.* v. 158; perennial, hispidly hairy, radical leaves small runcinately lyrate, flowers small white or rose, pedicels filiform, pods long very slender. Arabis? leptocarpa, *Wall. Cat.* 4784.

Dry parts of the Western Himalaya, from Kumaon to Kashmir, alt. 5–7000 ft.; Salt Range, *Stewart*.—Distrib. Affghanistan.

Stem 6–18 in., rough and hairy, especially near the base, with simple forked and stellate hairs, slender, erect. *Radical leaves* 1–3 in., crowded, spreading; terminal lobe large; cauline few, short, ½–1½ in., linear-lanceolate, pinnatifid or almost entire. *Flowers* white, changing to pale pink. *Fruiting racemes* long, lax, terminal; pedicels ¼–1 in., spreading. *Pods* 2–3½ in., spreading, curved, glabrous; valves slightly convex, midrib distinct; style short, tapering.

11. **S. minutiflorum,** *H. f. & T. Journ. Linn. Soc.* v. 158; annual, puberulous, very slender, much branched, leaves pinnately cut into few linear segments, flowers minute white, pods small narrow, stigma sessile. *Boiss. Fl. Orient.* i. 215; *Griff. Itin. Notes* 314, No. 1166.

Zanskar in Western Tibet, *Thomson*.—Distrib. Affghanistan.

Stem 2–9 in., stellately hairy, tortuous. *Leaves* small, thick. *Flowers* in numerous terminal racemes. *Fruiting racemes* elongate; pedicels $\frac{1}{8}$–$\frac{1}{6}$ in., spreading, as thick as the rachis. *Pods* $\frac{1}{2}$ in., straight or slightly curved; septum flat. *Seeds* very minute, oblong.—Boissier remarks that the seeds are unknown. There are numerous ripe pods in Griffith's specimens in the Kew Herbarium. The cotyledons are incumbent.

SECT. II. **Sophia.** *Flowers* yellow, pedicelled, ebracteate. *Pod* cylindric or flat, valves 1-nerved.

12. **S. Sophia,** *Linn.*; annual, erect, glabrous or pubescent, leaves 2–3-pinnatisect, flowers small, pedicels slender. *Reich. Ic. Fl. Germ.* t. 74, f. 4405; *H. f. & T. Journ. Linn. Soc.* v. 158.

PUNJAB, in the Salt Range and near Peshawur; Temperate Himalaya from KUMAON to KASHMIR, alt. 5–7000 ft.; WESTERN TIBET, alt. 9–14,000 ft.—DISTRIB. Westward, throughout Europe, N. Africa, and in N. and S. America.

Stem 1–2 ft., finely tomentose and somewhat hoary, or quite glabrous; branches ascending. *Leaves* numerous; segments short, linear. *Flowers* small, pale yellow. *Fruiting racemes* elongate, lax, terminal. *Pods* 1 in., spreading, or erect, on long pedicels, cylindric, subcompressed, curved, subtorulose; midrib prominent; stigma subsessile.

SECT. III. **Irio.** *Flowers* yellow, pedicelled, ebracteate. *Pods* terete, valves 3-nerved.

* *Fruiting pedicels as broad as the pod.*

13. **S. Columnæ,** *Jacq. Fl. Austr.* t. 323; annual, tall, glabrous or hairy below, leaves runcinate, sepals erect, valves of pod not ribbed. *Boiss. Fl. Orient.* i. 216; *H. f. & T. Journ. Linn. Soc.* v. 157.

Western Himalaya, from KUMAON to KASHMIR, ascending to 10,000 ft.; WESTERN TIBET, alt. 9–14,000 ft.—DISTRIB. Westward to Central Europe.

Stem 3 ft., stout, erect, slightly branching, subhispid with spreading or reflexed hairs, or all glabrous and glaucous. *Leaves* sometimes almost entire; segments toothed, from ovate-oblong to lanceolate; terminal lobe angled; of the upper leaves hastate. *Flowers* large, pale yellow. *Sepals* glabrous. *Pods* 3–4 in., spreading, very slender, curved, glabrous or slightly hairy; pedicel very stout; valves striated, indistinctly costate; style thickened, $\frac{1}{12}$ in.

14. **S. pannonicum,** *Jacq. Coll.* i. 70; *Ic. Pl. Rar.* t. 123; annual, hispid or glabrate, leaves runcinate-pinnatisect, sepals spreading, valves of pod 3-nerved. *Boiss. Fl. Orient.* i. 217; *H. f. & T. Journ. Linn. Soc.* v. 257. S. septulatum, *DC. Syst.* ii. 471.

Hassora in WESTERN TIBET, alt. 8000 ft., *Winterbottom.*

Stem rather tall, stiff, often simple below, and divaricately branched above. *Leaf-segments* nearly all similar, toothed or entire, of the lower leaves broad, of the upper, narrow-linear. *Flowers* large, pale yellow. *Sepals* glabrous, caducous. *Pods* 3–4 in., on short very thick pedicels, spreading or ascending, straight, obtuse, glabrous; septum membranous, projecting transversely between the seeds; style subelongate, thick; stigma large, 2-lobed.

** *Fruiting pedicels slender.*

15. **S. Irio,** *Linn.*; annual or biennial, tall, glabrous, leaves runcinate-pinnatifid, segments not auricled, flowers minute, pedicels slender, young pods overtopping the raceme, old 3-nerved, stigma sessile. *Reich. Ic. Fl. Germ.* t. 75, f. 4408; *H. f. & T. Journ. Linn. Soc.* v. 157. S. irioides, *Boiss. Fl. Orient.* i. 218; *H. f. & T. Journ. Linn. Soc.* v. 157.

In Northern India, from RAJPOOTANA to the PUNJAB.—DISTRIB. Affghanistan and westwards to the Canary Islands.

Stem 1–3 ft. tall, quite glabrous, or slightly pubescent near the base. *Leaves* petioled, pinnatifid or pinnatipartite; segments remote, spreading, toothed; terminal large, sometimes hastate. *Flowers* yellow. *Pods* 1½–2 in., slender, erect, glabrous, subtorulose; valves 3-nerved; pedicels ¼–½ in., ascending, curved.—*S. irioides* is said to be distinguished by a character that seems to be of no value. All the large flowered specimens resembling and previously referred to *S. Irio* are referable to *S. Lœselii.* Boissier's authentic specimen of *S. irioides* is unique; its flowers are described as double the size of those of *S. Irio* and the style as elongated.

16. **S. Lœselii,** *Linn.;* annual, tall, erect, reversedly hairy or glabrate, leaves sublyrately runcinate not auricled, flowers large, pedicels slender, pods slender terete not overtopping the raceme, style slender. *Reich. Ic. Fl. Germ.* t. 76, f. 4409; *H. f. & T. Journ. Linn. Soc.* v. 156: Leptocarpæa Lœselii, *DC.—Griffith Itin. Notes* 314, No. 1155.

Kashmir; alt. 5–7000 ft., *Thomson.*—Distrib. Westward to Central Europe.

Stem branched, and lower leaves hispid with simple recurved hairs or subglabrous. *Leaves* petioled; segments toothed; terminal lobe very large, hastate. *Flowers* numerous, pale yellow, not surmounted by the young pods. *Pods* 1–1½ in., slightly curved, glabrous; pedicels ascending, slender, ⅓ the length of the pod; style short, with a distinct 2-lobed stigma.

Sect. IV. **Alliaria.** *Flowers* white. *Pods* terete, valves 1–3-nerved. *Seeds* smooth or striate.

17. **S. Alliaria,** *Scop. Carn. ed.* 2, n. 825; annual or biennial, tall, erect, leaves long-petioled, lower reniform, upper cordate toothed, pods long, pedicel stout, valves 3-nerved. *H. f. & T. Journ. Linn. Soc.* v. 163. Alliaria officinalis, *Andrzj.; Reich. Ic. Fl. Germ.* t. 60, f. 379. Erysimum Alliaria, *Linn.*

Western Himalaya, from Kumaon to Kashmir, alt. 6–10,000 ft.—Distrib. Westward to W. Europe.

Stem 1–3 ft., subsimple, glabrous or sparsely hairy below. *Radical leaves* 2–3 in. diam., coarsely repand-crenate or toothed, upper ovate-cordate or deltoid, crenate. *Flowers* small, in lax racemes. *Pods* 1½–2 in.; pedicels stout, ¼ in., spreading, subcylindric, straight, glabrous; valves 3-nerved, midrib stout. *Seeds* oblong, striate and dotted.

18. **S. deltoideum,** *H. f. & T. in Journ. Linn. Soc.* v. 163; tall, erect, glabrous, leaves all petioled deltoid-ovate toothed, pods short, pedicels long, valves 1-nerved.

Eastern Himalaya; Sikkim, in the inner ranges, alt. 11–13,000 ft., *H. f.*

Stem 2–4 ft., stout. *Leaves* thin, 1½–3 in. diam., scarcely longer than broad. *Flowers* large, white. *Pods* ½–¾ in., pedicels as long, not thickened, spreading, stout, suberect, straight or curved, taper pointed; valves convex strongly keeled; septum flat. *Seeds* large, linear-oblong, smooth.—Perhaps an *Eutrema.*

19. **EUTREMA,** Br.

Glabrous leafy biennial or perennial herbs. *Leaves* entire or serrate, radical on long petioles, upper shortly petioled or sessile. *Flowers* white, corymbose. *Sepals* short, erect, equal at the base. *Filaments* entire. *Pods* linear or linear-oblong, terete; valves convex; style short. *Seeds* few, wingless, irregularly 1–2-seriate.—Distrib. Species 5, arctic Siberian and Himalayan.—Nearly allied to the section *Alliaria* of *Sisymbrium.*

1. **E. himalaicum,** *H. f. & T. Journ. Linn. Soc.* v. 164; stout, erect, leafy, cauline leaves sessile amplexicaul, flowers subcapitate in branched racemes.

Temperate SIKKIM HIMALAYA, alt. 10–13,000 ft., *H. f.*

A stout erect simple herb 18 in. high, glabrous or with a few hairs along the margins of the leaves and petioles. *Leaves* all entire, obtuse, radical long-petioled, oblong or ovate-cordate; cauline ovate or ovate-lanceolate, auricled at the base. *Flowers* rather large, white, in numerous terminal heads. *Pods* racemed, suberect; pedicels long, spreading. The ripe fruit is unknown.—Differs from the Soongarian *Smelowskia* (*Eutrema*) *integrifolia* only by its auricled cauline leaves.

2. **E. primulæfolium,** *H. f. & T. Journ. Linn. Soc.* v. 164; stemless, glabrous, radical leaves tufted, scapes leafy bracteate. Sisymbrium primulæfolium, *Thoms. in Hook. Kew. Journ. Bot.* iv. t. 10, and v. p. 18.

Wet rocks in the Western Himalaya, from KUMAON to KASHMIR, alt. 6–11,000 ft., *Thomson*, &c.

Root thick, fusiform, perennial. *Leaves* 3–6 in., all radical, petioled, broadly spathulate, toothed above the middle. *Scapes* numerous, usually shorter than the leaves, with a few leaf-like obovate bracts ¼–1 in. long. *Flowers* small, white. *Sepals* oblong, persistent. *Pods* ½–1 in., cylindric, curved, smooth; valves membranous, finely reticulate.

20. CONRINGIA, Reichb.

Glabrous, glaucous annuals. *Leaves* entire, oblong, auricled. *Flowers* racemose, ebracteate, yellow. *Sepals* elongate, equal at the base or the lateral saccate. *Petals* elongate, clawed. *Pods* elongated, linear, compressed or acutely tetragonal; valves 1–3-nerved, smooth or torulose; stigma simple or 2-lobed. *Seeds* 1-seriate, oblong, not margined; cotyledons incumbent. —DISTRIB. Species 6, natives of W. Asia and S. Europe.

Closely allied to *Sisymbrium*, but with the habit of *Brassica*.

1. **C. planisiliqua,** *Fisch. & Mey. Ind. Sem. Hort. Petrop.* 32; radical leaves petioled linear-oblong, cauline sessile. Erysimum planisiliquum, *Ledeb.* Sisymbrium planisiliquum, *H. f. & T. Journ. Linn. Soc.* v. 159.

WESTERN TIBET, alt. 10–14,000 ft., *Thomson.*—DISTRIB. Westwards to Persia, Soongaria and Armenia.

Stem erect, 1–2 ft. *Radical leaves* few, 2–3 in., obtuse, cauline with cordate amplexicaul bases. *Flowers* small; pedicels ½ in., slender. *Pods* 3–4 in., racemed, erect, narrow linear; valves slightly convex over the seeds.

21. ERYSIMUM, Linn.

Herbs, often hoary with appressed forked hairs. *Leaves* linear or oblong, entire or sinuate-toothed, base never auricled. *Flowers* yellow, rarely purple, ebracteate. *Sepals* erect, equal or the lateral gibbous at the base. *Petals* clawed. *Filaments* simple. *Pods* elongate, narrow, compressed tetragonal or terete; valves linear, 1-nerved, frequently keeled; septum membranous or corky; style short or long; stigma 2-lobed, capitate. *Seeds* numerous, 1-seriate, oblong, not margined; cotyledons incumbent.—DISTRIB. Species about 80, chiefly European and Oriental.

A genus in many respects intermediate between *Cheiranthus* and *Sisymbrium*. The Indian species are very difficult of discrimination, and little confidence can be placed in their diagnoses. They stand here as described 12 years ago in the Linnean Journal, since which time no materials of importance for their elucidation have been received.

* *Diffusely branched; ripe pods horizontal, subsessile; pedicel short, stout.*

1. **E. repandum,** *Linn.*; annual, hoary with close appressed hairs, leaves lanceolate repand-toothed or entire, flowers $\frac{1}{4}$–$\frac{1}{3}$ in. diam., pods rigid or flexuous obtusely 4-angled glabrous narrowed up to the truncate stigma, pedicel $\frac{1}{12}$ in. as thick as the pod. *H. f. & T. in Journ. Linn. Soc.* v. 164; *Boiss. Fl. Orient.* i. 189.

KASHMIR, alt. 5–7000 ft., *Winterbottom.*—DISTRIB. Persia, and westward to E. Europe and N. Africa.

Very variable in stature and robustness; hairs 2-partite with a few trifid ones intermixed. Boissier separates from it the Affghan plant (*E. Griffithii*, Boiss.) which was united with it in the Linnean Journal, on account of its entire leaves subcompressed pod and bracteate flowers.

** *Dwarf species; rootstock much divided giving off short crowded branches. Pods* 1–2 *in. long.*

2. **E. deflexum,** *H. f. & T. in Journ. Linn. Soc.* v. 165; hoary, hairs all appressed, leaves linear-spathulate slightly toothed, flowering branches short, fruiting deflexed with ascending tips, pedicels equalling the sepals, pods very narrow linear erect tetragonal acute, style distinct.

Alpine SIKKIM-HIMALAYA, at Kongra Lama, alt. 13–15,000 ft., *H. f.*

Easily distinguished by its small size and curious ramification, the stems that spring from the many crowned rootstock are 3–5 in. long, and bent down to the earth when fruiting, their pod-bearing tips alone ascending. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in. *Flowers* $\frac{1}{3}$ in. diam., ochreous-yellow. *Pods* 1$\frac{1}{2}$–2 by $\frac{1}{14}$–$\frac{1}{12}$ in. broad, narrowed into a style $\frac{1}{10}$ in. long; replum with slender flat sides, septum rather spongy. *Seeds* with very short funicles.

3. **E. funiculosum,** *H. f. & T. in Journ. Linn. Soc.* v. 165; hairs appressed, leaves linear-lanceolate, fruiting branches erect, pods fascicled erect linear-lanceolate compressed, valves obscurely keeled, style short conic, funicle very slender.

Alpine Sikkim Himalaya; at Kongra Lama, alt. 14–16,000 ft., *H. f.*

Root stout; stock dividing into a tuft of short branches and very short flowering shoots. Hairs chiefly fixed by the middle, a few are 3-furcate. *Flowers* as in *E. deflexum*. *Pods* $\frac{3}{4}$ in. long, broader and flatter and less keeled than in any other Indian species, sparsely appressed hairy. *Seeds* with capillary strict funicles as long as themselves; valves membranous, acute above, narrowed to a tapering base.

*** *Stem stout, erect, leafy; pods* $\frac{1}{2}$–3 *in. long.*

4. **E. hieraciifolium,** *Linn.*; stout or slender, green, hairs chiefly 2-forked appressed, leaves oblong sinuate-toothed upper sessile, flowers $\frac{1}{4}$–$\frac{1}{3}$ in. diam., pedicels equalling the sepals, pods strict erect narrow tetragonal scaberulous, pedicel stout upcurved, midrib strong, style short stout or slender. E. strictum, *Gærtn.*; *H. f. & T. in Journ. Linn. Soc.* v. 166. E. robustum., *Don Prodr.* 202; *Wall. Cat.* 4789. E. patens *and* E. gracile, *Gay Monog. Erys.* 9.

Central and Western Himalaya, from NIPAL, *Wallich*, to MARRI, *Fleming*, alt. 6–13,000 ft.—DISTRIB. Siberia, Caucasus, N. Europe.

Very variable, easily recognised amongst its Indian congeners by slender strict quite erect narrow linear pods, with upcurved stout pedicels, and distinct rather slender style.

5. **E. pachycarpum,** *H. f. & T. in Journ. Linn. Soc.* v. 167; stem very robust tall angled branched, hairs scattered chiefly appressed 3-forked, leaves petioled lanceolate sinuate-toothed, pedicels much shorter than the sepals, flowers $\frac{1}{3}$ in. diam., pods spreading very stout 4-angled on very thick

pedicels $\frac{1}{4}$ in. long minutely hairy, style thick $\frac{1}{12}$ in., valves obtuse at both ends.

Temperate Sikkim-Himalaya, in Lacken valley and Tungu, alt. 10–13,000 ft., *H. f.*

A remarkably stout, tall, erect plant, 1$\frac{1}{2}$–2 ft. high. *Stem* many-angled; branches, long. *Flowers* bright orange yellow. *Petals* obovate-spathulate. *Pods* 2–2$\frac{1}{2}$ by $\frac{1}{8}$ in.; valves obtusely keeled, obtuse at both ends; stigma large, capitate. *Seeds* small.

6. **E. odoratum,** *Ehr.?; H. f. & T. in Journ. Linn. Soc.* v. 166; erect, robust, stem angular above, leaves oblong or lanceolate sinuate-toothed or entire scaberulous, flowers $\frac{1}{2}$–$\frac{3}{4}$ in. diam., pedicels half as long as the sepals.

Kashmir, alt. 5–7000 ft., and Western Tibet, alt. 9000 ft.

Hairs on the upper leaf-surface appressed, fixed by the middle, with a few 3-furcate ones, on the lower both are mixed.

7. **E. altaicum,** *C. A. Meyer?; H. f. & T. in Journ. Linn. Soc.* v. 167; hoary with appressed hairs, stem short erect rather slender angled, leaves petioled linear-lanceolate entire or sinuate-toothed, radical sometimes runcinate, flowers large $\frac{1}{3}$–$\frac{1}{2}$ in. diam., pedicels shorter than the sepals.

Western Himalaya and Western Tibet, alt. 7–10,000 ft., *Jacquemont,* &c.—Distrib. Caucasus; Altai Mts.

**** *Stem sub-simple, stout, erect, leafy; pods* 3–5 *in. long.*

8. **E. Thomsoni,** *H. f. in Journ. Linn. Soc.* v. 165; tall, hoary with 3-furcate hairs, leaves small linear-lanceolate obscurely toothed, pods 3–4 in. long very narrow $\frac{1}{10}$ in. broad, pedicel stout $\frac{1}{3}$–$\frac{1}{2}$ in., valves acute hoary acutely keeled, style $\frac{1}{12}$ in.

Western Himalaya; Kunawur, alt. 8–12,000 ft., *Thomson.*

Best distinguished by its hoary branched habit, small narrow acute leaves, very long pods with acutely keeled valves and rather long style.—There is a smaller plant collected by Winterbottom in Kashmir on the Baramula pass, but it is not in fruit.

9. **E. longisiliquum,** *H. f. & T. in Journ. Linn. Soc.* v. 166; annual?, tall, erect, robust, glabrous, stem acutely angled, leaves lanceolate obscurely toothed, pedicels shorter than the sepals, pods spreading very slender linear, valves with a prominent keel, style $\frac{1}{10}$–$\frac{1}{8}$ in. stout, pedicels $\frac{1}{2}$ in.

Temperate Sikkim-Himalaya; at Tungu, alt. 10–13,000 ft., *H. f.*

The tall robust habit, acutely angled stem, size of flower, and very long spreading pods (4–5 by $\frac{1}{10}$ in.) best distinguish this.

22. CHRISTOLEA, Camb.

A glabrous or pubescent perennial. *Leaves* fleshy, entire or coarsely toothed. *Flowers* in a loose ebracteate raceme. *Sepals* short, suberect, lateral slightly saccate at the base. *Pods* linear-lanceolate, flattened; valves smooth 1-nerved; stigma minute, conical, subentire. *Seeds* few, sub-2-seriate, flattened, not margined; cotyledons linear, incumbent.

1. **C. crassifolia,** *Cambess. in Jacq. Voy. Bot.* 17, t. 17; leaves cuneate-obovate acute or obtuse, deeply toothed towards the tip. *H. f. & T. in Journ. Linn. Soc.* v. 167.

Western Tibet; alt. 12–15,000 ft., abundant.

A much branched, fragile herb; hairs simple; branches decumbent, stout. *Flowers* $\frac{1}{2}$ in. diam.; pedicels $\frac{1}{2}$ in., hairy, erect. *Petals* $\frac{1}{4}$ in., yellow with a purple base. *Pods* subsecund, 1–1$\frac{1}{2}$ in., erect, flat, acute at both ends, nearly glabrous.

23. **BRAYA,** Sternb. & Hoppe.

Small tufted glabrous or hoary pubescent alpine perennials, with a branching rootstock. *Leaves* mostly radical, spathulate or linear, entire or toothed. *Flowers* purple, rose-coloured or white, solitary or racemed. *Sepals* short, equal at the base. *Pods* ovate-oblong or linear, subcylindric or slightly compressed; valves convex, 1-nerved; style short or long; stigma capitate. *Seeds* usually 2-seriate, few or many ovoid, wingless.—Distrib. Species 12, alpine and arctic regions, the Andes.

1. **B. uniflora,** *H. f. & T. in Journ. Linn. Soc.* v. 168; glabrous, leaves linear-spathulate quite entire, scapes short 1-flowered.

Western Tibet; in Nubra, alt. 15–17,000 ft., *Thomson.*
Rootstock stout, fleshy, covered with bleached petioles, branched at the crown. *Leaves* fleshy, 1 in., petioled. *Scapes* many, about equalling the leaves. *Pods* linear, ⅓–½ in.; septum 2-nerved; style short. *Seeds* sub-2-seriate, many.

2. **B. alpina,** *Sternb. & Hoppe;* glabrous, leaves linear-spathulate, flowers capitate. *Deless. Ic. Select.* ii. t. 22. B. Thomsoni, *H. f. in Journ. Linn. Soc.* v. 168. B.? oxycarpa, *H. f. & T. l.c.* 169.

Western Tibet; Piti, alt. 12–13,000 ft., *Thomson, Stewart.*—Distrib. European high Alps, arctic regions.
Root stout, fleshy, long. *Leaves* tufted, ½ in. *Scapes* 1–4 in., leafless, or with few linear leaves. *Flowers* white or purple; pedicels ¼ in. *Pods* erect, linear- or elliptic-lanceolate, straight or curved, acute, glabrous; style usually long and slender. *Seeds* 1–2-seriate.—Very variable; the arctic American *B. glabella* is hardly distinct from it.

3. **B. rosea,** *Bunge; Led. Fl. Ross.* i. 194; glabrous or puberulous, leaves narrowly linear-oblong, flowers crowded corymbose, pods very short elliptic. *H. f. & T. in Journ. Linn. Soc.* v. 169.

Alpine Himalaya, from Sikkim to Kunawur, alt. 15–17,000 ft.; Western Tibet, alt. 14–18,000 ft.—Distrib. Altai Mts. and arctic Siberia.
Very similar to *B. alpina*, differing chiefly in the shorter pods (⅐–⅕ in.), and leafless scapes. *Seeds* 8–12 in each capsule; style variable in length.

4. **B. tibetica,** *H. f. & T. in Journ. Linn. Soc.* v. 168; hoary or pubescent, leaves narrow-linear, scapes naked, flowers subcapitate, petals minute, pods short ovate.

Western Tibet; alt. 13–18,000 ft., *Thomson.*
Rather rigid, purplish; rootstock much divided, clothed with withered petioles. *Leaves* erect, rarely spathulate, with 2–3 spreading teeth about the midrib; margins ciliate, rarely glabrous. *Scapes* many, 2–2½ in., rarely 1-leafed. *Sepals* hairy, edges membranous, white or red. *Petals* hardly exceeding the sepals. *Pods* ⅙ in. long, rarely glabrous; style long.

24. **BRASSICA,** Linn.

Glabrous or hispid herbs; rootstock often woody. *Leaves* large, pinnatifid or lyrate, rarely entire. *Flowers* yellow, in long racemes. *Sepals* erect or spreading, lateral usually saccate at the base. *Pods* elongate, terete or angular, often with an indehiscent 1-seeded beak; valves convex, 1–3-nerved, lateral nerves flexuose; style beaked or ensiform; stigma truncate or 2-lobed. *Seeds* 1-seriate, globose or subcompressed; cotyledons incumbent, concave or conduplicate, the radicle within the longitudinal fold. —Distrib. Species about 80; temperate regions of the Old World.

Sect. I. **Melanosinapis.** *Sepals* spreading. *Pods* terete or sub-tetragonal; valves 1-nerved; beak slender, seedless.

1. **B. nigra,** *Koch.*; leaves all petioled, lower lyrate, upper entire, racemes naked, pods slender appressed to the stem. *H. f. & T. in Journ. Linn. Soc.* v. 170. Sinapis nigra, *Linn.*; *Wall. Cat.* 4790. S. erysimoides, *Roxb. Fl. Ind.* iii. 123.

Cultivated in various parts of India and Tibet.

Annual, 2–3 ft. high, rigid, branched, more or less hispid. *Leaves* 4–8 in. *Flowers* ⅓–½ in. diam, bright yellow. *Pod* ¼–½ in., subulate; valves keeled, torulose; cells 3–5-seeded. *Seeds* oblong.

Sect. II. **Eubrassica.** *Sepals* erect. *Pod* sessile, cylindric, beak 0 or conical, seedless; valves 1-nerved. (The Cabbage, *B. oleracea*, with its cultivated forms, the Kale, Sprouts, Cole-rabi, Cauliflower and Broccoli, belong to this section.)

2. **B. campestris,** *Linn.*; erect, lower leaves lyrate, upper auricled, flowers cormybose, beak of pod flat seedless. *H. f. & T. in Journ. Linn. Soc.* v. 169. Sinapis brassicata, *Linn.* S. dichotoma *and* S. glauca, *Roxb. Fl. Ind.* iii. 117, 118.

Cultivated throughout India.

An erect, stout, simple or branched, glabrous or slightly hispid annual, 1–3 ft. high. *Leaves* large, petioled, more or less pinnatifid, upper oblong or lanceolate. *Flowers* large, bright yellow; pedicels ¾ in., ascending or spreading. *Pods* 1½–3 in., glabrous, suberect; valves with midrib and flexuous veins. *Seeds* small, smooth, pale or dark.

Subsp. 1. campestris proper; root tuberous, leaves glaucous, radical hispid, upper glabrous, petals persistent till the corymb lengthens.—(*Swedish Turnip.*)

Subsp. 2. Napus, *Linn.* (sp); root fusiform, leaves all glabrous and glaucous, petals deciduous before the corymb lengthens.—(*Rape, Cole seed; yields Colza and Carcel oils.*)

Subsp. 3. Rapa, *Linn.* (sp.); root tuberous, lower leaves hispid not glaucous, upper glaucous and glabrous, petals deciduous.—*Common Turnip.*

3. **B. trilocularis,** *H. f. & T. in Journ. Linn. Soc.* v. 170; lower leaves lyrate, cauline amplexicaul auricled, pods pendulous long-beaked 3–4-valved. Sinapis trilocularis, *Roxb. Fl. Ind.* iii. 121.

Subtropical Central and Eastern Himalaya, Nipal, Sikkim, and Assam, in fields.

Habit of subspecies *Napus*, but easily distinguished by the remarkable pendulous 3–4-celled and valved pods, which are 2½–3 in. long; beak 1¼ in., terete, tapering; valves with midrib and flexuous lateral nerves. *Seeds* large, globose, smooth, pale or dark.

4. **B. quadrivalvis,** *H. f. & T. in Journ. Linn. Soc.* v. 169; habit and foliage of *B. trilocularis*, but pods smaller, on erect short pedicels, 4-celled and valved, beak flattened.

Cultivated fields of *B. campestris* in the Upper Gangetic valley; banks of the Soane, *H. f.*

Sect. III. **Brassicoides.** *Sepals* erect. *Pods* sessile, beak seed-bearing; valves 1-ribbed.

5. **B. Tournefortii,** *Gouan*; *Boiss. Fl. Orient.* i. 393; radical leaves hispid runcinate-lyrate, cauline linear-lanceolate, flowers small pale yellow, pods short compressed. B. Stocksii, *H. f. & T. in Journ. Linn. Soc.* v. 171.

Upper Gangetic valley; between Ajmir and Delhi, *Jacquemont*; Western Tibet (cultivated), *Edgeworth.*—Distrib. Westward to Spain and Italy.

An erect, branching, hispid or glabrate annual, 1 ft. high. *Radical leaves* petioled, crowded, spreading on the ground, hispid with white hairs, lobes toothed; cauline entire or pinnatifid. *Pods* 2¼ in., erect, glabrous, linear, compressed, torulose, beak ⅝ in., linear, slightly tapering, obtuse, usually 1 seeded; valves with a central and many distant lateral nerves. *Seeds* compressed.

SECT. IV. **Ceratosinapis.** *Sepals* spreading. *Pods* slightly compressed, beak subulate usually seedless; valves 3-ribbed. *Seeds* globose.

6. **B. juncea,** *H. f. & T. in Journ. Linn. Soc.* v. 170; erect, glabrous, lower leaves oblong-lanceolate toothed, upper narrow, pods suberect torulose, beak long seedless, lateral nerves flexuous. B. Willdenovii, *Boiss. in Ann. Sc. Nat.* 1842, p. 88. Sinapis juncea, *Linn.* S. integrifolia, *Willd.* S. ramosa, rugosa, *and* cuneifolia, *Roxb. Fl. Ind.* iii. 119–124.

Cultivated in India abundantly.—DISTRIB. Cult. westward to Egypt, and eastward to China.

A tall erect branching annual, rarely glaucous, or hispid (at the base only). *Lower leaves* petioled, sometimes pinnatifid; upper lanceolate, toothed, subsessile. *Flowers* bright yellow. *Pods* ½ in., linear-lanceolate; beak straight, flattened, ½ in.; valves with a prominent midrib. *Seeds* small, dark, rugose.

7. **B. alba,** *H. f. & T.*; stem hispid, leaves pubescent pinnatisect, upper segments confluent, pods spreading cylindric torulose usually hirsute, beak very long, decurrent along the pod, 1-seeded. B. foliosa, *Willd. Enum.* 688. Sinapis alba, *Linn.*

Cultivated fields at Ferozepore in the PUNJAB, *Thomson.*—DISTRIB. From Syria eastward throughout S. Europe.

An erect annual, 2 ft. high, with a hispid or rarely glabrous stem. *Leaves* all petioled, usually hispid; segments ovate, toothed or lobulate. *Pods* about 1 in., stalked, spreading, cylindric, beak half as long, flattened, sometimes 2 seeded, valves and base of the beak white with hispid hairs.

Sinapis patens, *Roxb. Fl. Ind.* iii. 124, is a *Nasturtium.*

25. DIPLOTAXIS, DC.

Annual or biennial branching herbs. *Leaves* pinnatifid. *Flowers* yellow pink or purple. *Sepals* spreading, equal at the base. *Pods* elongate, linear, compressed, sometimes with a short 1-seeded beak; valves 1-nerved; style generally slender, stigma simple or 2-lobed. *Seeds* numerous, 2-seriate, oblong, compressed or subglobose; cotyledons incumbent, conduplicate.—DISTRIB. Species about 20; Mediterranean region, Western and Central Asia.

A genus closely allied to *Brassica* but differing in the flat pods, biseriate seeds, often pilose sepals, and pink or purple flowers.

1. **D. Griffithii,** *H. f. & T.*; hispid, lower leaves oblong entire or cut, flowers large, pedicels slender, style very stout. Brassica Griffithii, *H. f. & T. in Journ. Linn. Soc.* v. 171; *Boiss. Flor. Orient.* i. 389.

Kalebag in the Salt Range of the PUNJAB, *Fleming.*—DISTRIB. Affghanistan and Beluchistan.

A robust, erect, branched annual, 1–3 ft. high, hispid especially below with spreading or reflexed hairs. *Lower leaves* shortly petioled, oblong or oblong-lanceolate, entire toothed lobed or pinnatifid; upper lanceolate, less divided. *Flowers* purplish or white. *Pods* 1½–2¼ in., erect, linear.—Dr. Anderson was disposed to unite with this *D. acris*, Boiss. (*Hesperis*, Forsk) a native of Arabia and N. Africa.

26. ERUCA, Tourn.

Erect branching herbs. *Leaves* lyrate-pinnatifid. *Flowers* lilac or yellow, veined with violet. *Sepals* erect, lateral saccate at the base. *Petals* veined. *Pods* closely adpressed to the axis, ovoid-oblong, turgid, terete, with a large ensiform seedless beak; valves concave, 3-nerved; stigma simple. *Seeds* numerous, 2-seriate, globose; cotyledons conduplicate. — Distrib. Three species, inhabiting the Mediterranean region and W. Asia.

1. **E. sativa,** *Lamk.;* Brassica Eruca, *Linn; H. f. & T. in Journ. Linn. Soc.* v. 171. B. erucoides, *Roxb. Fl. Ind.* iii. 117.

Cultivated places in Northern and Central India, the Western Himalaya, ascending to 10,000 ft., and Upper Gangetic valley.—Distrib. Westward to the Canaries.

Glaucous, glabrous, or subhispid *Stem* 6–18 in. *Leaves* variously toothed, rarely obovate and subentire. *Flowers* large, pale yellow or white and veined. *Sepals* often tipped with hairs. *Pods* 1 in., erect and appressed to the stem; pedicels shorter than the calyx; valves twice as long as the broad flattened peak.

27. MORICANDIA, DC.

Smooth glaucous branched herbs, often woody at the base. *Leaves* entire, amplexicaul or pinnatisect. *Flowers* rather large, violet, purple or rose colored. *Sepals* erect, lateral saccate at the base. *Petals* clawed. *Pods* linear, elongate, subtetragonal, with or without a flattened 1-seeded beak; valves flat or bluntly keeled, 1- rarely many-nerved; stigmatic lobes united into a short cone. *Seeds* numerous, 1–2-seriate, compressed, sometimes winged; cotyledons incumbent, conduplicate.—Distrib. Species about 5, natives of the Mediterranean region, Arabia, and W. Asia.

1. **M. arvensis,** *DC. Syst. Veg.* ii. 626; glaucous, glabrous, leaves obovate obtuse, cauline amplexicaul, pods tetragonal compressed, beak broad, seeds small sub-2-seriate. *H. f. & T. in Journ. Linn. Soc.* v. 172. Brassica arvensis, *Linn.*

Stewart.—Distrib. Westward to Persia, Arabia, and the Mediterranean region.

Biennial, or a perennial of short duration. *Leaves* 2–4 in., shortly petioled; cauline ovate or oblong with large clasping auricles. *Flowers* few, large, shortly pedicelled, in a loose long raceme. *Petals* rose-coloured, much larger than the sepals. *Pods* 2–3 in., very narrow, erect; valves nerved; style usually broad, thickened, acute, sometimes long and slender.

2. **M. tortuosa,** *H. f. & T. in Journ. Linn. Soc.* v. 172; leaves elliptic-oblong, cauline sessile, pods long subcylindric, beak cylindric acute, seeds 1-seriate. Douepia tortuosa, *Cambess. in Jacq. Voy. Bot.* 18, t. 18.

Salt plains of the Punjab, West of the Indus, *Jacquemont;* Salt range, *Fleming.*

An erect, glaucous, glabrous, branched perennial, 1–2 ft. high. *Stem* below thick, woody, sometimes tortuose. *Leaves* thick, mucronate, entire or crenate-sinuate; lower 3–5 in., narrowed into a broad petiole. *Flowers* few, large, erect, scattered along a lengthened raceme. *Petals* pale rose-coloured, nearly twice the length of the sepals. *Pods* erect, or ascending, linear; beak $\frac{1}{8}$ in.; style short, conical, pointed; valves convex, striated, margins prominent. *Seeds* subglobose.

28. **CAPSELLA,** Mœnch.

Small branched annuals or perennials. *Radical leaves* entire or pinnatifid. *Flowers* small, white, racemed. *Sepals* spreading, equal at the base. *Petals* short. *Pods* obcordate cuneate ovate or oblong, laterally compressed; valves convex or boat-shaped; septum very narrow; style short. *Seeds* numerous, 2-seriate, narrowly margined; cotyledons incumbent.—DISTRIB. Species 6, natives of N. and S. temperate regions.

1. **C. Bursa-pastoris,** *Mœnch.*; leaves rosulate pinnatifid, pod triangular or obcordate. *H. f. & T. in Journ. Linn. Soc.* v. 172.

Cultivated places throughout temperate India.—DISTRIB. A weed of cultivation.

Glabrous or hairy; hairs branched; root long, tapering. *Stems* 6–16 in., branched. *Leaves* pinnatifid, rarely entire, upper lobe triangular, cauline auricled. *Flowers* $\frac{1}{10}$ in. diam. *Pods* $\frac{1}{4}$–$\frac{1}{3}$ in.; pedicels slender; style short; valves smooth. *Seeds* many, oblong, punctate.

2. **C. elliptica,** *C. A. M.*; *Led. Fl. Ross.* i. 199; annual, glabrous, stems slender decumbent and ascending, leaves entire or pinnatifid, pods ovate-oblong truncate. *H. f. & T. in Journ. Linn. Soc.* v. 172. C. procumbens, *Boiss. Fl. Orient.* i. 340. Hutchinsia procumbens, *Desv.*

WESTERN TIBET, alt. 14,000 ft., *Thomson.*—DISTRIB. Westward to S. Europe and N. Africa (Australia, Chili, perhaps introduced).

Stems 2–10 in., numerous from the root, filiform, flexuous. *Leaves* $\frac{1}{6}$–$\frac{1}{2}$ in., radical petioled, oblong or spathulate; upper more sessile, linear, entire. *Flowers* minute, white, in elongating racemes with a capillary rachis. *Pods* distant, $\frac{1}{6}$–$\frac{1}{5}$ in., on long capillary horizontal pedicels; valves boat-shaped. *Seeds* many, minute.

3. **C. Thomsoni,** *H. f. in Journ. Linn. Soc.* v. 173; perennial, hoary-tomentose, branches spreading from the root, leaves pinnatisect, racemes leafy, pod broadly oblong truncate at both ends. Hutchinsia tibetica, *Thomson in Hook. Ic. Pl.* t. 900.

WESTERN TIBET, alt. 16–18,000 ft., Nubra, *Strachey*; Ladak, *Thomson.*

Root long, fusiform, almost woody, crowned by a short stock that emits many prostrate leafy branches, 2–6 in. long, with ascending tips. *Leaves* sessile, $\frac{1}{4}$–1 in., linear-oblong, segments lanceolate. *Flowers* crowded, white, in the axils of leafy bracts, very shortly pedicelled. *Pods* $\frac{1}{4}$ in.; valves much compressed, obscurely keeled veined; stigma sessile, minute. *Seeds* numerous, very small, funicles slender.—A very curious plant, quite unlike its congeners, with the habit of the Siberian *Hutchinsia calycina*, Desv. (*Smelowskia*, C. A. M.)

29. **LEPIDIUM,** Linn.

Diffuse or erect herbs, undershrubs or shrubs, with entire or divided leaves. *Flowers* small, white, ebracteate. *Sepals* short, equal at the base. *Petals* sometimes 2–4 or 0. *Stamens* 6, 4, or 0. *Pods* ovate or oblong, rarely globose, usually orbicular, laterally much compressed, tip notched or entire; valves boat-shaped, keeled or winged; septum narrow, membranous. *Seeds* solitary in each cell; cotyledons incumbent (in the Indian species).—DISTRIB. Species about 80, chiefly European and Asiatic.

SECT. I. **Cardamum.** *Pods* ovate or oblong, notched at the tip; valves winged. *Cotyledons* divided.

1. **L. sativum,** *Linn.*; erect, radical leaves 2-pinnatisect, pods orbicular-ovate, wings narrow. *H. f. & T. in Journ. Linn. Soc.* v. 174 (Cress.).

Cultivated throughout India and Western Tibet.

A glabrous erect annual, 6–18 in. *Radical leaves* long-petioled; cauline sessile and usually entire. *Flowers* small, in long racemes, white. *Pods* deeply notched; pedicels appressed.—Not known in an indigenous state.

SECT. II. **Cardaria.** *Pod* transversely oblong, tip entire; valves turgid, wingless.

2. **L. Draba,** *Linn.*; pubescent, perennial, leaves oblong repand-toothed, upper with sagittate auricles. *H. f. & T. in Journ. Linn. Soc.* v. 173. L. chalepense, *Schrenk.*, and L. repens, *Boiss. Fl. Orient.* i. 356.

A weed of cultivation in the PUNJAB.—DISTRIB. Westwards to Europe.

Stem 1–3 ft., simple or branched, flexuous. *Leaves* 1–3 in., lower petioled, upper with converging auricles. *Flowers* $\frac{1}{4}$ in. diam., white, in branched panicles. *Pod* $\frac{1}{8}$ in., deltoid with rounded angles, constricted between the papillose valves, of which one is often imperfect; pedicels spreading.

SECT. III. **Lepidiastrum.** *Pod* elliptic or ovoid, tip entire; valves wingless.

3. **L. latifolium,** *Linn.*; perennial, erect, glaucous, radical leaves oblong serrate, pod ovoid. *H. f. & T. in Journ. Linn. Soc.* v. 173.

WESTERN TIBET, abundant. DISTRIB. Europe, N. and W. Asia, N. Africa.

An erect, branched, glabrous or pubescent leafy almost shrubby herb, 2–4 ft high. *Radical leaves* petioled, often 1 ft. long, upper cauline sessile. *Flowers* minute, in short densely panicled bracteate corymbs. *Pods* $\frac{1}{12}$ in. long; pedicels short, spreading.

VAR. PLATYCARPA, *Trautv.*; leaves rather fleshy entire indistinctly 3 nerved, flowers capitate, pods orbicular slightly pilose and reticulate.—WESTERN TIBET, *Thomson*, *Stewart*.

SECT. IV. **Dileptium.** *Pod* elliptic or oblong, tip retuse or notched; valves keeled, wingless or winged at the tip only.

4. **L. ruderale,** *Linn.*; annual, lower leaves 2-pinnatifid, flowers apetalous diandrous, pod orbicular-oblong flat, valves winged at the tip. *H. f. & T. Journ. Linn. Soc.* v. 175.

Temperate WESTERN TIBET, alt. 7–13,000 ft., *Thomson.*—DISTRIB. Westward throughout Europe.

Erect or diffuse, glabrous or pubescent. *Radical leaves* much divided, segments narrow; upper cauline linear, entire. *Flowers* minute in terminal and lateral corymbs. *Pod* $\frac{1}{14}$–$\frac{1}{12}$ in.; pedicles slender, diverging. *Seeds* compressed.

5. **L. capitatum,** *H. f. & T. in Journ. Linn. Soc.* v. 175; prostrate, leafy, leaves sessile upper cuneate-oblong toothed beyond the middle, flowers tetrandrous in dense lateral capitate racemes, pods of *L. ruderale.* L. incisum, *Edgew. in Trans. Linn. Soc.* xx. 33 (*not of Ledebour*).

Temperate and subalpine Himalaya, from SIKKIM to KUMAON, alt. 10–14,000 ft.

Glabrous or glandular-pubescent; branches 6–8 in., stout. *Radical leaves* shortly petioled, pinnatisect; lobes oblong. *Petals* scarcely exceeding the sepals. *Pods* $\frac{1}{12}$ in., ovate, scarcely notched; valves keeled, wingless, sessile. *Seeds* mucilaginous when moistened.

30. **DILOPHIA,** Thoms.

A dwarf glabrous fleshy herb, with a long tapering perennial root, and tufted spathulate or linear, entire or toothed leaves. *Flowers* numerous, small, white, in densely contracted sessile subumbellate racemes. *Sepals* spreading, equal at the base. *Petals* spathulate, retuse or toothed. *Pods* very short compressed on the 4 sides, obcordate; valves gibbous at the back, with a double crest; septum broad, perforated, ultimately disappearing. *Seeds* 2–4 in each cell, oblong, wingless, on short thickened cords; cotyledons incumbent.

1. **D. salsa,** *Thoms. in Hook. Kew Journ. Bot.* v. 20, *and* iv. t. 12.

In salt marshes in WESTERN TIBET, alt. 12–17,000 ft.—DISTRIB. Tian Schan Mts.

Root simple, giving off many stout spreading stems at the crown. *Sepals* and *petals* persisting round the opening pods.—Specimens collected by Baron Von Œsten Sacken in the Tian Schan Mts., and which Ruprecht described in his Sertum Tianshanicum, differ but slightly from the Tibetan ones.

31. **MEGACARPÆA,** DC.

Large coarse perennial herbs, with a thick fleshy root and stem, and large 2-pinnate radical leaves. *Flowers* racemed or subcorymbose, white or violet coloured. *Sepals* equal at the base. *Petals* oblong, entire. *Stamens* 6 or numerous, filaments not toothed. *Pods* large, indehiscent, didymous, much flattened at the sides; valves orbicular, broadly winged; stigma sessile. *Seeds* large, solitary in each cell, much flattened, not winged; cotyledons accumbent.—DISTRIB. Species 3, 2 Tibetan the 3rd Caspian.

1. **M. polyandra,** *Benth. in Hook. Kew Journ. Bot.* 1855, vii. 356, t. 7; leaf-segments incised and toothed, stamens 10–16, pods notched at the base and tip, lobes orbicular. *H. f. & T. in Journ. Linn. Soc.* v. 176.

WESTERN TIBET; Balti, alt. 10.500 ft., *Winterbottom;* Western Himalaya, KUMAON, alt. 12,000 ft, *Strachey and Winterbottom.*

Root as thick as the wrist, annulate. *Stem* 1–2 ft., as thick as the thumb below, branched above. *Leaves* 1–2 ft., a span broad; segments very irregular, sharply toothed. *Inflorescence* much branched, puberulous; flowers cup-shaped, ⅓ in. diam., shorter than their pedicels, white. *Filaments* stout, fleshy, subulate. *Ovary* broadly obovate, base dilated into the fleshy lobed disk; stigma entire, discoid. *Pod* 2 in. diam., wings nearly as broad as the cell, veined. *Seed* reniform.

2. **M. bifida,** *Benth. l.c.* 357; leaf-segments lanceolate quite entire, stamens 7–11, pods deeply 2-lobed, lobes obovate at length conniving. *H. f. & T. in Journ. Linn. Soc.* v. 176.

WESTERN TIBET, in the Kishengunga valley, alt. 7400 ft., *Winterbottom;* Deotsu, *Falconer.*

Stem 12–18 in., stout, stiff, erect. *Leaves* with decurrent quite entire lobes 2–3 in. long, acute or acuminate. *Pods* 2–3 in. diam., lobes broadly obliquely obovate, sinus acute, wings equalling ¾ of the cell.—Specimens very imperfect, Winterbottom has only a fragment of a leaf well preserved, with quite entire lobes. Falconer's specimens are so shrivelled as to be hardly recognizable, and the accompanying leaves, which are toothed, probably belong to *M. polyandra.*

32. **THLASPI,** Linn.

Annual or perennial herbs. *Leaves* entire or toothed, the upper often clasping the stem. *Flowers* racemose, small, white or rarely pale rose. *Sepals* small, erect, equal at the base. *Petals* equal or nearly so. *Pod* orbicular obovate or obcordate, laterally compressed, emarginate, rarely acute; valves boat-shaped, keeled or broadly winged; septum narrow, membranous, style short or long. *Seeds* 2 or more in each cell, not winged; radicle accumbent.—DISTRIB. Species about 30; natives of temperate Europe, Asia, and N. America.

1. **T. arvense,** *Linn.;* glabrous, annual, erect, leaves obovate oblong toothed, cauline amplexicaul, seeds concentrically grooved. *H. f. & T. in Journ. Linn. Soc.* v. 176.

A weed of cultivation throughout the temperate and subalpine HIMALAYA, ascending to 14,000 ft.—DISTRIB. Europe, Asia, always in cultivated places.

Stem 6–18 in., simple or corymbosely branched above. *Radical leaves* petioled, soon withering; cauline 4 in., oblong-lanceolate, usually acute, toothed; auricles sagittate. *Fruiting racemes* elongate; pedicels spreading, a little longer than the pods. *Pods* $\frac{1}{3}$–$\frac{3}{4}$ in. diam., much flattened, obovate-orbicular, wing very broad, notch deep, sometimes closed by the overlapping of the sides. *Seeds* 5–6 in each cell.

2. **T. cardiocarpum,** *H. f. & T. in Journ. Proc. Linn. Soc.* 176; annual, erect, leaves broadly oblong obscurely toothed, cauline amplexicaul, seeds smooth.

KASHMIR, alt. 5–9000 ft.—DISTRIB. Affghanistan.

Slightly glaucous, less robust than the preceding. *Stem* 6–12 in.; branches basal, few, tall, erect. *Radical leaves* shortly petioled; cauline ovate or oblong, obtuse, erect; auricles broadly sagittate. *Racemes* elongate in fruit, pedicels $\frac{1}{4}$ in. *Pods* broadly notched at the tip; valves with a membranous reticulated wing, broad and rounded above. *Seeds* 4–5 in each cell.—Closely allied to and perhaps identical wtth *T. Kotschyanum,* Boiss., of which we have not seen ripe fruit.

3. **T. alpestre,** *Linn.;* perennial, tufted, radical leaves oblong or ovate, cauline cordate amplexicaul, pods triangular-obcordate, seeds smooth. *H. f. & T. in Journ. Linn. Soc.* v. 177. T. cochleariforme, *DC.* T. Griffithianum, *Boiss. Fl. Orient.* i. 329.

Temperate and subalpine HIMALAYA and WESTERN TIBET from SIKKIM to KASHMIR, alt. 7–12,000 ft.; in Sikkim only on the dry inner ranges.—DISTRIB. Alps of Europe, Asia, America; Andes.

Stem 4–12 in., stiff, glabrous, somewhat glaucous, erect, simple or branched. *Rootstock* often branching and shortly creeping near the surface. *Radical leaves* sometimes almost orbicular, cauline oblong or obovate-cordate; auricles small obtuse. *Flowers* rather large, white; racemes much elongated in fruit; pedicels horizontal, as long as the pods. *Pods* $\frac{1}{4}$ in., narrowed at the base, broadly not deeply notched; valves compressed, wing very narrow below, broader above; angles rounded, outer often sharp; style equalling the notch or projecting beyond it. *Seeds* 4–8 in each cell.

4. **T. cochlearioides,** *H. f. & T. in Journ. Linn. Soc.* v. 177; small, decumbent, glabrous, perennial, radical leaves very long-petioled orbicular-ovate, scape flexuous decumbent few-flowered, pods oblong curved and twisted.

Interior of the Sikkim Himalaya, alt. 14–16,000 ft., *H. f.*

Somewhat fleshy. *Rootstock* slender, branching above and sparingly covered with the fibrous bases of the old petioles. *Stems* few, 1–2 in., weak, decumbent or suberect, with 2 or 3 small sessile ovate leaves. *Radical leaves* loosely tufted, petioles slender, slightly toothed, under side pitted. *Flowers* small, white, in a short corymb. *Pods* $\frac{1}{6}$ in., racemose, emarginate; valves compressed, narrowly bordered; style short, slender.

33. **IBERIDELLA,** *Boiss.*

Glabrous herbs or small undershrubs, branching from the base. *Leaves* alternate, rarely opposite, upper generally amplexicaul with sagittate auricles. *Flowers* white or rose-coloured, racemose. *Sepals* erect, lateral saccate at the base. *Petals* equal. *Pod* compressed, oblong-lanceolate, acute; valves keeled, without wings; septum narrow, membranous; style elongate. *Seeds* 2 to 6 in each cell, not margined; cotyledons obliquely accumbent.—DISTRIB. Species 6, W. Asiatic.

1. **I. Andersoni,** *H. f. & T. in Journ. Linn. Soc.* v. 177; radical leaves short petioled tufted ovate-oblong, cauline oblong obtuse.

Western Himalaya in KUMAON, *Strachey and Winterbottom;* and GARWHAL, *T. Anderson;* alt. 12–16,000 ft., in wet grassy places.

Root slender, branching above. *Stems* erect, 2–4 in. high, simple or branched from the base; flowerless shoots weak, decumbent. *Radical leaves* indistinctly toothed; cauline with small cordate auricles; leaves of the barren shoots broadly ovate or almost orbicular, shortly petioled. *Flowers* numerous, racemed, rather large, white or pale rose. *Pods* (immature) ⅓ in., much flattened, narrow, lanceolate, curved, acute; valves wingless; style very short, acute, tapering from the base.

34. **ISATIS,** Linn.

Erect, tall, branching annuals or biennials, with petioled radical leaves; cauline sessile sagittate. *Flowers* small, yellow, in loose terminal racemes. *Sepals* equal at the base, spreading. *Petals* equal, entire. *Pod* flat, oblong obovate or cuneate-oblong rarely suborbicular, 1-celled, indehiscent; centre hard, often depressed; margin membranous foliaceous or thickened; stigma sessile. *Seed* solitary, pendulous, oblong; cotyledons incumbent, rarely accumbent.—DISTRIB. Species about 30, natives of the Mediterranean region, and Central and W. Asia.

1. **I. tinctoria,** *Linn.*; biennial, radical leaves entire or coarsely toothed, cauline glabrous, pods cuneate-oblong 1-ribbed, pedicel not thickened at the tip. *H. f. & T. in Journ. Linn. Soc.* v. 178.

Cultivated places; WESTERN TIBET, *Falconer.*—DISTRIB. Westward to Europe and the Canary Islands.

Erect, somewhat glaucous and glabrous with a few hairs near the base. *Stem* 1½–3 ft., stout, thick, much branched above. *Radical leaves* 2–5 in., petioled, from obovate to oblong-lanceolate, cauline narrow, 1–2 in. long, entire, auricles acute sagittate. *Flowers* small, yellow, racemed in a many branched panicle; pedicels glabrous, very slender, recurved after flowering. *Pods* ½–¾ in., glabrous, rounded at the tip, tapering to the base; midrib thickened at the centre of the pod.

2. **I. costata,** *C. A. Mey. in Led. Fl. Alt.* iii. 204; annual, glaucous, radical leaves obovate or oblong entire, cauline ciliate, pods elliptic-oblong 3-ribbed, pedicel thickened at the tip. *H. f. & T. in Journ. Linn. Soc.* v. 170.

WESTERN TIBET; valley of the Kishengunga in Balti, alt. 4–7000 ft., *Winterbottom;* Gores, *Falconer.*—DISTRIB. Altai mountains, Soongaria, Caspian region to the Volga.

Stem 3 ft., thick, erect, branched above. *Radical leaves* 3–5 in., tip rounded, base tapering into a short petiole; cauline linear-oblong, 2–4 in., uppermost linear, ½ in., margins and midrib beneath ciliate. *Racemes* loosely panicled; pedicels glabrous, spreading or recurved, subsecund. *Pods* ½ in., rounded at the tip, glabrous.

35. **TAUSCHERIA,** Fisch.

An erect, glabrous, branching annual. *Leaves* entire, stem-clasping. *Flowers* small, yellow, in corymbose panicles. *Sepals* erect, equal at the base. *Pods* short, boat-shaped, concave above, convex below, centre crustaceous, indehiscent, 1-celled with a broad wing folded inwards at the edges and prolonged into a short triangular style. *Seed* solitary, pendulous from the top of the cell, cotyledons incumbent.

1. **T. lasiocarpa,** *DC. Prodr.* i. 210. T. desertorum, *Led. Ic. Pl. Fl. Ross.* t. 139; *Royle Ill.* 72, t. 17; *H. f. & T. in Journ. Linn. Soc.* v. 178.

KUNAWUR in the Western Himalaya and WESTERN TIBET, alt. 10–13,000 ft.—DISTRIB. Soongaria and the Caspian region.

Stem 1 ft., seldom branching from below. *Leaves* ovate-oblong, radical subpetioled, cauline with cordate auricles. *Flowers* in a loose corymbose panicle; pedicels recurved in fruit. *Pods* $\frac{1}{8}$ in., thickly glandular-hairy.—All the Tibetan and Himalayan specimens have pubescent pods and hence belong to var. *lasiocarpa;* plants with glabrous pods occur in Soongaria and the Caspian region, apparently associated with var. *lasiocarpa.*

36. DIPTERYGIUM, Dcne.

A virgate rigid much branched shrub with the habit of a *Cleome*, the branches ending in few-flowered racemes. *Leaves* small, ovate-oblong, entire. *Flowers* small, few, in bracteate racemes. *Sepals* short, equal at the base. *Stamens* free; filaments entire, 1-celled, ellipsoid, compressed laterally, indehiscent, coriaceous, surrounded by a membranous wing. *Seed* solitary, erect, winged; cotyledons concave, incumbent.

1. **D. glaucum,** *Decaisne in Ann. Sc. Nat. Sér.* 2, iv. 67; *H. f. & T. in Journ. Linn. Soc.* v. 179; *Boiss Fl. Orient.* i. 417. Isatis spartioides, *Edgew. mss.*

In the PUNJAB, near Mooltan, *Edgeworth.*—DISTRIB. Arabia, N. E. Africa.

A shrub, 6–12 in., with many divaricate branches, glabrous, or the leaves and stem slightly rough with viscid glands. *Leaves* few, $\frac{1}{6}$–$\frac{1}{2}$ in. long, shortly petioled. *Flowers* subsessile; bracts scaly, $\frac{1}{10}$ in. *Pods* $\frac{1}{8}$ in., transversely wrinkled, drooping.

37. NESLIA, Desv.

An annual herb, with branched pubescence. *Leaves* entire or sinuate-toothed, cauline sagittate. *Flowers* small, yellow, in ebracteate panicled racemes. *Sepals* spreading, equal at the base. *Petals* entire. *Pods* shortly stalked, subglobose, slightly flattened, coriaceous, indehiscent. *Seed* solitary; cotyledons incumbent.

1. **N. paniculata,** *Desv. Journ.* iii. 162; *H. f. & T. in Journ. Linn. Soc.* v. 179; *Boiss. Fl. Orient.* i. 371.

In the PUNJAB-HIMALAYA, from Hazara to the Beas, *Stewart;* KASHMIR, alt. 5–6000 ft.—DISTRIB. In fields; Persia, Western Asia, temperate Europe.

Stem 1–1$\frac{1}{2}$ ft., erect, rather slender, simple below. *Radical leaves* 1–2 in., oblong-lanceolate, cauline shorter, auricles sagittate. *Flowers* numerous, on long slender spreading glabrous pedicels. *Pods* a little broader than long, reticulated, glabrous; style slender, sharp.

38. EUCLIDIUM, Br.

Branching, leafy, rigid annuals, with forked or branched pubescence. *Leaves* entire coarsely toothed or pinnatifid. *Flowers* small, white, in terminal or lateral, ebracteate racemes. *Sepals* spreading, equal at the base. *Pods* small, erect, subsessile, subglobose, crowned by an oblique subulate beak, hard and crustaceous, indehiscent, rarely dehiscent, 2-celled; septum thick. *Seeds* 2, oblong, pendulous; cotyledons accumbent or obliquely incumbent.—DISTRIB. Species 2, central and western Asia.

1. **E. syriacum,** *R. Br. in Hort. Kew. ed.* 2, iv. 74; *H. f. & T. in Journ. Linn. Soc.* v. 179; *Boiss. Fl. Orient.* i. 386; *Griff. Itin. Notes* 272, No. 631.

KASHMIR, alt. 5–6000 ft., *Winterbottom;* PUNJAB, at Peshawur, *Stewart.*—DISTRIB. Westwards to central Europe.

Diffuse, much branched, 4–12 in. high, with 2–3-furcate hairs or glabrous; branches stout, rigid when old. *Leaves* 1–4 in., petioled, oblong-lanceolate. *Flowers* distantly subspicate; pedicels very short, much thickened in fruit. *Pods* $\frac{1}{8}$ in. long, pitted, hairy; beak (style) stout, obliquely reflexed, mucronate.

39. **CRAMBE,** Tourn.

Stout herbs or undershrubs, glabrous or pilose. *Leaves* pinnate lyrate or toothed. *Racemes* elongate, ebracteate, usually panicled. *Flowers* conspicuous, white. *Sepals* spreading, equal at the base; filaments of the longer stamens frequently toothed at the top. *Pods* indehiscent, articulate, the upper joint globose, 1-celled, 1-seeded; lower seedless forming a pedicel to the upper joint. *Seed* globose, pendulous from the incurved tip of the funicle, which rises from the base of the cell; cotyledons conduplicate.—DISTRIB. Species about 20, European and temp. Asiatic.

1. **C. cordifolia,** *Stev. in Mem. Soc. Nat. Mosq.* iii. 267; *H. f. & T. in Journ. Linn. Soc.* v. 180; *Boiss. Fl. Orient.* i. 405. C. Kotschyana, *Boiss. Orient.* i. 406.

KUNAWUR in the Western Himalaya, and in WESTERN TIBET, alt. 10–14,000 ft.—DISTRIB. Westward to Persia and the Caucasus.

A tall stout bristly hairy perennial. *Stem* striated. *Rootstock* thick. *Radical leaves* on stout petioles, 1–2 in., petiole striated and dilated at the base, rounded and cordate, laciniate and variously toothed; cauline on shorter petioles, ovate elliptic or rhomboid, toothed or lobed. *Racemes* loosely panicled. *Pods* globose, upper part pisiform, crustaceous.—Some Tibetan specimens have broader petals and shorter stamens (with the filaments of the long stamens almost simple) than are found in the Affghan and Caucasian; but these plants agree in all other respects. Stocks says the root is eaten in Beluchistan.

40. **PHYSORHYNCUS,** Hook.

A glabrous, glaucous, leafy undershrub. *Leaves* fleshy, lower petioled, upper auricled. *Flowers* large, white, in elongated distantly flowered ebracteate racemes. *Sepals* erect, equal at the base. *Pods* indehiscent 2-jointed, the lower joint longitudinally 2-celled, seedless, with small spurious valves; upper joint large, ovoid, with a long conical beak (style) 2-celled, with thick lacunose walls; cells 2–4-seeded; septum thin; stigma subcapitate. *Seeds* flattened, pendulous from the side of the cells; cotyledons conduplicate.

1. **P. brahvicus,** *Hook. Ic. Pl.* t. 821 and 822, *Boiss. Fl. Orient.* i. 403 (with syn). P. chamærapistrum, *Boiss. l.c.*

PUNJAB, in the Salt Range, *Vicary.*—DISTRIB. Westwards to Southern Persia.

An erect perennial, about 2 ft. high. *Leaves* 1–4 in., ovate-oblong, entire- or repand-toothed, tip rounded or acute, lower petioled; cauline narrowed at the base, slightly decurrent and auricled, uppermost linear-lanceolate. *Pedicels* erect, $\frac{1}{4}$ in., a little thickened at the top. *Pods* $\frac{1}{2}$–$\frac{3}{4}$ in.

41. **RAPHANUS,** Linn.

Coarse, rough or glabrous annuals or biennials. *Leaves* lyrate-pinnate or pinnatifid. *Flowers* large, yellow, white or pale lilac, veined with purple, in long ebracteate racemes. *Sepals* erect, lateral ones saccate at the base. *Pods* indehiscent, elongate, terete, thick, continuous or constricted, with a long tapering pointed beak, continuous within or filled with pith separating the seeds. *Seeds* pendulous, globose; cotyledons conduplicate.—DISTRIB. Species about 6, European and Asiatic.

1. **R. sativus,** *L.; DC. Prodr.* i. 228; lower leaves lyrate. (Radish.)

Cultivated throughout India, and up to 16,000 ft. in the Himalaya.—DISTRIB. With cultivation throughout the temperate and warm zones.

Root fleshy, variable in size and form. *Leaves* roughly pilose. *Flowers* variable, usually white or lilac with purple veins. *Pods* terete, continuous, 1 in. to 2 ft. (*R. caudatus* L.).—The variety (*R. caudatus*), with whip-like pods as long as the entire plant, is commonly cultivated in Western India and the Punjab. The younger Linnæus (*Pl. Rar. Hort. Upsal*, Dec. i. t. 10, an excellent figure) gives Java as the country from whence the seeds of *caudatus* were received, under the name "Mougri." *R. Raphanistrum*, Linn., can scarcely be distinguished from *R. sativus*, and is probably only the wild state of it.

42. **GOLDBACHIA,** DC.

A glabrous, glaucous, branched annual. *Lower leaves* petioled, upper auricled. *Flowers* small, pale rose, in elongate, ebracteate racemes. *Sepals* erect, equal at the base. *Pods* coriaceous, indehiscent, tetragonal, slightly constricted between the seeds, but scarcely jointed, curved, tapering above into a broad flattened beak; cells 2 or 3, superimposed in one row, each 1-seeded. *Seeds* oblong, pendulous; cotyledons incumbent.

1. **G. lævigata,** *DC. Syst.* ii. 577; radical leaves many ovate-oblong sinuate-toothed. *H. f. & T. in Journ. Linn. Soc.* v. 180; *Boiss. Fl. Orient.* i. 243. G. torulosa, *DC. l.c.*

KASHMIR, alt. 5000 ft., *Jacquemont;* common in the PUNJAB.—DISTRIB. Westward to S. Russia.

Stem 9–15 in. high. *Radical leaves* 4–5 in.; cauline lanceolate, usually slightly toothed, shortly auricled. *Pods* pendulous, $\frac{1}{3}$ in. long, reticulately veined, costate at the angles; pedicels rather slender, reflexed, shorter than the pods.—Boissier describes a variety, *B. ascendens*, having erect pods, with reflexed pedicels. The numerous Indian specimens examined have all drooping pods, with the exception of one from Affghanistan, in which the lower pods are ascending.

43. **CHORISPORA,** DC.

A small, branching or tufted, glandular or hairy herb. *Leaves* entire or pinnatisect. *Flowers* yellow or purple, in few-flowered ebracteate racemes; pedicels lengthened, usually thickening after flowering. *Sepals* erect, lateral saccate at the base. *Pod* elongate, cylindric, torulose, indehiscent, with a lengthened beak; cells numerous, 2-seriate, 1-seeded; lobes of the stigma erect; cotyledons accumbent.—DISTRIB. About 7 species, natives of Western Asia.

1. **C. tenella,** *DC. Syst. Veg.* ii. 435; annual, leaves oblong-lanceolate or spathulate, flowers purplish, pedicels very short, pods obscurely toru-

lose, style rigid subulate. *H. f. & T. in Journ. Linn. Soc.* v. 181; *Boiss. Fl. Orient.* ii. 143.

Western Himalaya and the Punjab; Kashmir, alt. 5–7000 ft. *T. T.*; Salt Range, *Fleming.*—Distrib. Central Asia and westward to Asia-Minor.

Pilose or rough glandular, rarely glabrous. *Stem* 6–9 in., much branched from the base. *Leaves* shortly petioled; lower sometimes pinnatifid; upper entire or toothed. *Flowers* small, remote, purple (like those of *Malcolmia africana*). *Racemes* much elongate in fruit. *Pods* $1\frac{1}{2}$ in., ascending, slender, curved, transverse-jointed, not constricted between the seeds, beak long subulate; pedicels $\frac{1}{6}$–$\frac{1}{4}$ in., spreading, ultimately as thick as the pods.

2. **C. sibirica,** *DC. Syst.* ii. 437; annual, glandular-hairy, leaves interruptedly pinnatifid, pedicels slender, pods slender curved torulose moniliform, beak slender subulate. *H. f. & T. in Journ. Linn. Soc.* v. 181.

Hasora in Western Tibet, *Winterbottom.*—Distrib. Western and Altaian Siberia.

A straight, spreading herb, 6–8 in., with numerous branches from the base. *Leaves* narrow; lobes equal, entire or lobulated, acute; terminal long, lanceolate. *Flowers* rather large, yellow, few, very remote in lengthened racemes. *Pods* 1 in., usually curved; cells 2-seriate, opposite, or one row a little higher than the other, but never alternate, pedicels more slender than the pods, ascending or sometimes arched.

3. **C. sabulosa,** *Camb. in Jacq. Voy. Bot.* 15, t. 15; perennial, glandular-hairy, leaves entire toothed or pinnatifid, flowers yellow or purplish, pedicels very slender, pods irregularly deeply torulose, joints gibbous, beak short slender. *H. f. & T. in Journ. Linn. Soc.* v. 181; *Boiss. Fl. Orient.* i. 144; *Griff. Itin. Notes*, 306, n. 1054. C. elegans, *Camb. l.c.* 15, t. 14.

Western Himalaya, from Kunawur to Kashmir; and Western Tibet, alt. 10–17,000 ft.—Distrib. Affghanistan.

Root thick, fleshy, fusiform, branching at the crown. *Leaves* all radical, tufted, petioled, oblong-lanceolate, lobes obtuse. *Racemes* springing from among the leaves, dense at first, soon elongating to 6–9 in. *Flowers* large. *Pods* $\frac{1}{2}$–$\frac{3}{4}$ in. long, straight, curved or twisted; cells opposite or almost alternate, tuberculated; pedicels erect, slender, thickened at the top, as long as the pod.

Order XI. **CAPPARIDEÆ.** (By Hooker f. & Thomson.)

Herbs shrubs or trees, erect or climbing. *Leaves* simple or palmately 3–9-foliolate; stipules 2 or 0, sometimes spinescent. *Inflorescence* indefinite; flowers solitary racemed corymbose or umbelled, regular or irregular, usually 2-sexual. *Sepals* 4, free or connate, valvate or imbricate, rarely open in bud. *Petals* 4 (rarely 2 or 0), hypogynous or seated on the disk, imbricate or open in bud. *Stamens* 4 or more, hypogynous or perigynous, or at the base of or on a long or short gynophore. *Disk* 0, or tumid, or lining the calyx-tube. *Ovary* sessile or stalked, 1-celled; style short or 0, stigma depressed or capitate; ovules indefinite, on 2–4 parietal placentas amphi- or campy-lotropous. *Fruit* capsular or berried. *Seeds* angled or reniform, exalbuminous; embryo incurved.—Distrib. Genera 23, species 300, chiefly tropical.

An order with various abnormal genera.—*Cratæva* has petals inserted on a large disk; *Mærua* and *Niebuhria* (which want petals) are calycifloral; *Cadaba* has a unilateral disk (bundle of filaments?). *Roydsia*, with 6 sepals, a 3-locular ovary, 3 subulate styles, axile placentation and a straight embryo, though included here, might well form the type of a distinct Order.

Tribe I. **Cleomeæ.** Herbs. *Fruit* capsular.

Stamens sessile on the disk. Petals imbricate in bud . . . 1. Cleome.
Stamens on the gynophore. Petals open in bud . . . . . . 2. Gynandropsis.

Tribe II. **Cappareæ.** Shrubs or trees. *Fruit* berried or capsular.

Calyx tube lined by the disk, lobes valvate.
  Petals 0. Fruit ovoid . . . . 3. Niebuhria.
  Petals 4. Fruit moniliform . . . . 4. Mærua.
Sepals 4, open in bud. Disk hemispheric . . . . 5. Cratæva.
Sepals 4, 2-seriate, imbricate, or 2 outer valvate.
  Stamens 4–6, inserted high on the gynophore . . . . . . 6. Cadaba.
  Stamens 8–∞, inserted at the base of the gynophore . . . 7. Capparis.
Sepals 6, 2-seriate. Ovary 3-celled; styles 3 . . . . 8. Roydsia.

1. CLEOME, Linn.

Herbs. *Leaves* simple or digitately 3–9-foliolate. *Flowers* racemed, yellow rose or purple. *Sepals* 4, spreading. *Petals* 4, regular or ascending. *Stamens* 4–8, sessile on the disk. *Ovary* sessile or with a short gynophore; style short or 0; ovules many, on 2 parietal placentas. *Capsule* oblong or linear, valves 2 separating from the seed-bearing placentas. *Seeds* reniform.—Distrib. Species about 80, chiefly tropical.

C. heptaphylla, L., a W. Indian species, is cultivated in India; it is a tall hairy viscid annual, with prickly stems, 7 leaflets, large purple flowers, and a long gynophore.

* *Leaves simple.*

1. **C. monophylla,** *Linn.; DC. Prodr.* i. 239; leaves oblong-lanceolate puberulous penninerved, bracts petiolate, stamens 6. *Wall. Cat.* 6965; *W. & A. Prodr.* 21; *Roxb. Fl. Ind.* iii. 129; *Thwaites Enum.* 14; *Oliv. Fl. Trop. Afric.* i. 76. C. cordata, *DC. l.c.*—*Burm. Zeyl.* t. 100, f. 3.

Western Peninsula from Behar and the Concan to Ceylon, in fields and waste places.—Distrib. Tropical Africa.

Stem 1–2 ft., erect, branched. *Leaves* 1–2 in., base rounded or cordate. *Flowers* ½–1 in. long, dull purple; racemes elongating in fruit. *Petals* long-clawed, ascending. *Capsules* 2–4 in., striate, subsessile or shortly stalked. *Seeds* rugose.

2. **C. papillosa,** *Steud. Nomencl. ed.* 2, i. 382; hairy, often glandular, leaves ovate-cordate obtuse strigose papillose penninerved, bracts small sessile, stamens 6. *Oliv. Fl. Trop. Afric.* i. 76; *Edgew. l.c.* vi. 184. C. gracilis, *Edgew. in Journ. As. Soc. Beng.* xvi. 1212.

Arid districts of Sindh and Western Punjab.—Distrib. Abyssinia, Kordofan, Arabia.

Stem 6–12 in., erect, branched, strong scented. *Leaves* ½–1½ in., lower long-petioled, upper subsessile. *Flowers* very small, pinkish at length dirty yellow; racemes elongate in fruit; bracts oblong, upper pedicels ebracteate. *Capsules* 1–1½ in., subsessile, very slender, finely striate. *Seeds* glabrous, granulate.

3. **C. quinquenervia,** *DC. Prodr.* i. 239; viscid, leaves suborbicular palmately 5-nerved softly pubescent, bracts leafy, stamens 4 or 6. *T. Anders. in Journ. Linn. Soc.* v. *Suppl.* 3; *Griff. Itin. Not.* 323, n. 1261. C. Noreana, *Boiss. Fl. Orient.*

Arid districts of Sindh and Western Punjab, *Griffith*, &c.—Distrib. Affghanistan, Persia, Arabia.

Stem 6–12 in., erect; branches spreading from the base, rigid woody, strongly aromatic. *Leaves* 1 in. diam., obtuse or acute, base cordate or rounded, margins and long petioles glandular. *Flowers* small; racemes elongate in fruit; bracts usually subsessile, rarely narrow, upper sometimes 0. *Capsules* 1–1½ by ⅙ in., sessile, narrow-oblong, acute at both ends; hairs short rigid with tubercled bases, mixed with soft black glandular hairs. *Seeds* minute, smooth.—Anderson describes 6 stamens, we find only 4.

4. **C. Stocksiana,** *Boiss. Fl. Orient.* i. 414; glandular above, leaves ovate or obovate tubercled palmately 3-nerved, bracts small or leafy, stamens 6, filaments clavate. *Griff. Itin. Notes* 225, n. 183.

Rocky hills in Sindh, *Stocks.*—Distrib. Beluchistan.

Perennial; branches spreading from the base, erect or ascending, white, glabrous, rough below, densely glandular and tubercled above. *Leaves* 1 in., fleshy, acute or obtuse; petiole 1–1¼ in. *Flowers* small, pale purple, at length yellow; racemes short or long, densely glandular. *Petals* obovate-spathulate, clawed. *Capsules* 1½ by ⅙ in., broad-linear, subsessile, pendulous, striate. *Seeds* large, brown hairy.

5. **C. simplicifolia,** *H. f. & T.*; prostrate, strigose, leaves obovate-oblong or lanceolate, bracts leafy, stamens 10–12, filaments filiform. Polanisia simplicifolia, *Camb. in Jacq. Voy. Bot.* 20, t. 20; *Dalzell & Gibs. Bomb. Fl.* 8. P. burtporensis, *Munro in Wight Ic.* t. 1072. C. monophylla, *Law in Graham Cat. Bomb. Pl.* 7.

Northern India, near Burtpore, *Munro;* drier parts of the Dekkan and Concan.

Annual, 6–18 in., much branched from the base. *Leaves* 1–2 in., obtuse or acute, all scaberulous, hairs with scale-like bases. *Flowers* ¼ in., violet, in elongating leafy racemes. *Filaments* filiform. *Capsule* ¾–1¼ in., subsessile, torulose; beak ⅙ in. *Seeds* large, brown, smooth.

** *Leaves compound. Stamens* 6.

6. **C. tenella,** *Linn. f.; DC. Prodr.* i. 240; glabrous, leaves 3-foliolate, leaflets linear, capsule subsessile glabrous. *W. & A. Prodr.* 21; *Wall. Cat.* 6966; *Oliv. Fl. Trop. Afric.* i. 78. C. angustifolia, *A. Rich. Fl. Seneg.* 20.

Driest parts of the Carnatic, *Heyne*, &c.—Distrib. Trop. Africa.

Annual, 3–12 in.; branches many, slender, spreading. *Leaflets* equalling or exceeding the petiole. *Flowers* minute, purplish, in few-flowered racemes; bracts simple or 3-foliolate. *Capsules* 1–1¼ in., linear. *Seeds* minute, smooth.—Indian specimens are rather smaller than African.

7. **C. brachycarpa,** *Vahl ex DC. Prodr.* i. 240; musky, glandular and rough, leaves 3–5-foliolate upper simple, leaflets obovate or oblong, capsule scaberulous. *T. Anders. in Journ. Linn. Soc.* v. *Suppl.* 4; *Edgew. l.c.* vi. 184; *Oliv. Fl. Trop. Afric.* i. 77. C. Ruta, *Camb. in Jacq. Voy. Bot.* 19, t. 19. C. Vahliana, *Fresen.*; and diversifolia, *Hochst.*

N.W. India, from Agra, *Jamieson*, westward to Peshawur, *Stewart;* Sindh, *Stocks.* —Distrib. Arabia, Abyssinia.

Perennial, 6–12 in., branched from the base. *Leaflets* ¼–½ in., lower petioled, floral subsessile. *Flowers* ¼–½ in. long, yellow, long-peduncled, in leafy racemes. *Capsules* ⅓ in., oblong. *Seeds* minute, smooth.

8. **C. aspera,** *Kœnig ex DC. Prodr.* i. 241; branches glabrous prickly, leaves 3-foliolate, leaflets equalling or exceeding the petioles, flowers axillary, capsule sessile slender torulose. *W. & A. Prodr.* 22; *Wall. Cat.* 6967; *Wight Ic.* t. 287. C. diffusa, *Roxb. Fl. Ind.* iii. 129.

Western Peninsula and Ceylon; common in sandy soil.

Annual, 6–18 in.; branches many from the root, prickles minute. *Leaflets* ¼–½ in.

Flowers ½ in. long, dull yellow, solitary, long-pedicelled. *Capsules* 1–1½ in., sessile, slender, beaked. *Seeds* large, glabrous, transversely rugose.

9. **C. Burmanni,** *W. & A. Prodr.* 22; branches glabrous prickly, leaves 3-foliolate, leaflets shorter than the petiole obovate or oblong-lanceolate, flowers axillary, capsule stalked terete. Polanisia dodecandra, *DC. l.c.* 242.—*Burm. Thes. Zeyl.* t. 100, f. 1 (*not good*).

Fields of the CARNATIC, and in CEYLON, *Kœnig*, &c.

Annual, 6–18 in.; branches many from the root. *Leaflets* 1 in., acute or obtuse. *Flowers* ¼ in., solitary, purple. *Capsules* 2 in., terete, glabrous, striate, tapering at both ends; stalk $\frac{1}{12}$–$\frac{1}{6}$ in., slender. *Seeds* glabrous, transversely rugose.—C. ciliata, *Sch. & Th.*, of tropical Africa approaches this very closely.

*** *Leaves compound. Stamens* 10–∞.

10. **C. felina,** *Linn. f. Suppl.* 300; rough with rigid scale-like hairs, leaves 3-foliolate, leaflets obovate, flowers axillary long-pedicelled, stamens 28–32, capsule glabrous. Polanisia felina, *DC. Prodr.* i. 242; *Wall. Cat.* 6971; *W. & A. Prodr.* 22 (*excl. syn. Hort. Malab.*).

Southern provinces of the CARNATIC, *Kœnig*, &c.

Annual, erect, 1–2 ft., much branched. *Leaflets* ½–1 in., obtuse, equalling or shorter than the petiole. *Flowers* ½–¾ in. long, solitary, purple. *Calyx* and *corolla* bristly outside. *Filaments* filiform. *Capsule* 1–1½ by ⅙ in., compressed, linear-oblong, acute at both ends, striate. *Seeds* large, glabrous, tubercled.

11. **C. viscosa,** *Linn.*; softly pubescent, leaves 3–5-foliolate, leaflets ovate or obovate, flowers racemed long-pedicelled, stamens 12–20, capsule glandular-pubescent. *Roxb. Fl. Ind.* ii. 128. C. icosandra, *Linn.* Polanisia viscosa, *DC. Prodr.* i. 242; *Wall. Cat.* 6968. Polanisia icosandra, *W. & A. Prodr.* 22; *Wight Ic.* t. 2.—*Rheede Hort. Mal.* ix. t. 33.

Abundant throughout tropical and warm India, and the rest of the world.

Annual, erect, 1–3 ft., hairs simple and glandular mixed. *Leaflets* equalling or shorter than the petiole, upper usually subsessile. *Flowers* ½ in. long, yellow. *Petals* reflexed. *Capsule* 2–3½ in., striate, narrowed to the tip. *Seeds* small, granular.

12. **C. Chelidonii,** *Linn. f. Suppl.* 300; glabrous or sparsely scabrid, leaves 5–9-foliolate, leaflets obovate or oblong, flowers racemose then corymbose long-pedicelled, stamens very many, capsule glabrous. *Roxb. Fl. Ind.* iii. 127. Polanisia Chelidonii, *DC. Prodr.* i. 242; *W. & A. Prodr.* 22; *Wight Ic.* t. 319; *Wall. Cat.* 6969; *Dalz. & Gibs. Bomb. Fl.* 8. P. heterophylla, *Wall. Cat.* 6970. P. Schraderi *and* Leschenaultii, *DC.* Corynandra pulchella, *Schrad.*

Moist places from the N. Circars, *Roxburgh*, and POONA, *Jacquem.*, southwards.—DISTRIB. Java.

Annual, erect, 1–3 ft., much branched, glabrous or with few bristles. *Leaves* long-petioled, pubescence appressed, scabrid; leaflets 1–1½ in., obtuse or acute. *Flowers* ¾–1 in. diam., regular, rosy; bracts small, simple or 3-foliolate. *Petals* sessile, ovate. *Filaments* clavate above. *Capsule* 2–4 in., slender, tapering at both ends, striate. *Seed* rather large, pale brown, muricate.

2. GYNANDROPSIS, DC.

An annual glandular-pubescent or glabrate herb. *Leaves* 5-foliolate, long-petioled. *Flowers* racemed. *Sepals* 4, spreading. *Petals* 4, spreading, long-clawed, open in bud. *Stamens* 6, filaments adnate below to the slender gynophore, spreading above. *Ovary* stalked, ovules many. *Capsule* elongate, stalked ; valves 2, separating from the seed-bearing placentas. *Seeds* reniform, black, scabrous.

1. **G. pentaphylla,** *DC. Prodr.* i. 238 ; leaflets broad-obovate acute or obtuse entire or serrulate. *W. & A. Prodr.* 21 ; *Wall. Cat.* 6964 ; Cleome pentaphylla, *Linn. ; Roxb. Fl. Ind.* ii. 126.—*Rheede Hort. Mal.* ix. t. 34.

Abundant throughout the warm parts of India and all tropical countries.

Erect, branched, 1–3 ft. *Leaflets* 1–2 in. *Flowers* ⅓–⅔ in. diam., white or purplish, in glutinous racemes ; bracts 3-foliolate. *Capsules* 2–4 in., nearly glabrous, striated.

3. NIEBUHRIA, DC.

Trees or shrubs, unarmed. *Leaves* 1–5-foliolate ; stipules setaceous. *Flowers* solitary or corymbose. *Calyx-tube* ovoid ; limb 4-cleft, valvate. *Petals* 0. *Stamens* indefinite, united on the gynophore at about the level of the top of calyx-tube ; filaments filiform, exserted. *Ovary* stipitate, 1-celled ; ovules many on 2 parietal placentas ; stigma subsessile. *Berry* ovoid, 1-seeded. *Seed* large ; cotyledons fleshy involute.—DISTRIB. Species about 8, tropical African and Asiatic.

1. **N. linearis,** *DC. Prodr.* i. 244 ; glabrous, leaves 3–5-foliolate, leaflets ovate oblong linear or lanceolate, flowers racemed. *Wall. Cat.* 6975 ; *W. & A. Prodr.* 23 ; *Wight Ic.* t. 176 ; *Hook. Ic. Pl.* t. 124. Capparis apetala, *Roth. Nov. Sp.* 238. C. linifolia, *Roxb. Hort. Beng.* 41. Cratæva apetala, *Spreng. Syst.* ii. 448.

Hilly parts of the CARNATIC, *Roth, Wight,* &c.

A small tree, bark pale grey. *Leaflets* 1–2 by ½–1 in., equalling the petiole of the leaf, minutely wrinkled, shortly petiolulate ; 5 and linear in young plants. *Racemes* 1–2 in., terminal, few-flowered. *Calyx* ½ in., persistent. *Berry* ½–⅔ in., ovoid or subglobose, 1–3-seeded ; stalk 1–1½ in.

4. MÆRUA, Forskahl.

Climbing shrubs. *Leaves* simple. *Flowers* corymbose. *Calyx-tube* lined by a disk ; lobes 4, valvate. *Petals* 4 (in the Indian species), smaller than the calyx-lobes, ovate, inserted on the edge of the disk. *Stamens* many, inserted high up on the gynophore, filaments exserted. *Ovary* long stalked, 1-celled, or 2-celled by the cohesion of the placentas ; ovules many, on 2–4 parietal placentas. *Berry* fleshy, elongate, moniliform, 1- or more-seeded. *Cotyledons* fleshy, involute.—DISTRIB. Species about 20, tropical Asiatic and African.

1. **M. arenaria,** *H. f. & T.* ; glabrous or pubescent, leaves broad-ovate acute or oblong and obtuse or retuse, corymbs terminal or on lateral shoots, petals lanceolate acute.

WESTERN HIMALAYA, and CENTRAL INDIA, abundant : var. 2. GANGETIC PLAIN, about Delhi and Agra.

A large woody climber. *Leaves* ½–3 in. *Flowers* ⅔–1 in. long, white. *Calyx-tube* dilated upwards, about ½ as long as the limb. *Berry* 2–5 in., deeply constricted between the seeds.—*M. oblongifolia* of Arabia and Africa differs only in the cylindric calyx-tube equalling its limb.

VAR. 1. *glabra* ; glabrous and glaucous except the margins of the calyx-lobes. Niebuhria arenaria *and* oblongifolia, *DC. Prodr.* i. 244 ; *Wall. Cat.* 6976 ; *W. & A. Prodr.* 24 *in part* ; *Hook. Ic. Pl.* t. 127. Capparis heteroclita, *Roxb. Fl. Ind.* ii. 570.

VAR. 2. *scabra* ; young shoots and upper leaves scabrous, calyx softly pubescent. M. scabra and ovalifolia, *Camb. in Jacq. Voy. Bot.* 22, t. 23, 24. Niebuhria oblongifolia, *Royle Ill.* 73.

5. **CRATÆVA,** Linn.

Trees. Leaves 3-foliolate. *Flowers* large, yellow or purplish, polygamous. *Sepals* 4, cohering below with the convex lobed disk. *Petals* 4, long-clawed, open in bud. *Stamens* indefinite, adnate to the base of the gynophore. *Ovary* on a slender stalk, 1-celled; stigma sessile, depressed; ovules many, on 2 parietal placentas. *Berry* fleshy. *Seeds* imbedded in pulp.—DISTRIB. Species about 6, tropical and cosmopolitan.

1. **C. religiosa,** *Forst.; DC. Prodr.* i. 243; leaflets ovate or ovate-lanceolate appearing with the large greenish yellow at length purplish flowers. Capparis 3-foliata, *Roxb. Fl. Ind.* ii. 571.

Near streams in MALABAR and CANARA; cultivated elsewhere in India.—DISTRIB. Trop. Africa.

A spreading, unarmed, deciduous tree. *Leaves* long-petioled; leaflets 3–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., abruptly or gradually acuminate, pale beneath. *Flowers* 2–3 in. diam., in terminal corymbs. *Petals* ovate or oblong, obtuse or acute; claw $\frac{1}{4}$ as long as the limb. *Berry* 1–2 in. diam., many-seeded.—Very variable. Intermediates may be found between the following varieties. The form of the ovary and fruit does not always correspond with that of the leaflets. Imperfect specimens of a Mergui species of Griffith, with large broad obtuse thick coriaceous leaves, may be different.

VAR. 1. *Nurvala;* leaflets ovate-lanceolate taper-pointed, berry ovoid. C. Nurvala, *Ham. in Trans. Linn. Soc.* xv. 122; *Wall. Cat.* 6973; *W. & A. Prodr.* 23.—*Rheede Hort. Malab.* iii. t. 42.

VAR. 2. *Roxburghii;* leaves small ovate-lanceolate abruptly acuminate, berry globose. C. Roxburghii, *Br. in Denh. & Clapp. Travels, App.* 224; *W. & A. Prodr.* 23; *Hook. Ic. Pl.* t. 178. C. odora, religiosa, *and* unilocularis, *Ham. l.c.*; *Wall. Cat.* 6972.

6. **CADABA,** Forskahl.

Unarmed shrubs. *Leaves* simple or 3-foliolate. *Flowers* solitary corymbose or racemed. *Sepals* 4, unequal, 2-seriate, 2 outer valvate. *Petals* 4, or 2, rarely 0, clawed, hypogynous. *Disk* equalling the petal-claw, trumpet-shaped or spathulate, with a tubular claw. *Stamens* 4–6, unilateral on the slender gynophore; filaments filiform, exserted, spreading. *Ovary* long-stalked, 1-celled; stigma sessile; ovules many, on 2–4 parietal placentas. *Fruit* fleshy, slender, cylindric, berried or dehiscing tardily upwards by 2 valves, which leave the pulpy placentas. *Seeds* subglobose, testa cartilaginous; cotyledons convolute.—DISTRIB. Species about 12, tropical and subtropical African and Asiatic.

1. **C. trifoliata,** *W. & A. Prodr.* 24; leaves palmately 3-foliolate, leaflets oblong or lanceolate, petals 2, stamens 6, fruit tardily dehiscent. C. triphylla, *Wight in Hook. Bot. Misc.* 296, *Suppl.* t. 37. Strœmeria trifoliata, *Roxb. Fl. Ind.* ii. 79. Desmocarpus missionis, *Wall. Cat.* 6798.

Southern parts of the CARNATIC, *Berry*, &c. Drier parts of CEYLON.

A rigid branched shrub, bark brown, shoots rather hairy. *Leaflets* 2 in.; petioles $\frac{1}{3}$–$\frac{1}{2}$ in. *Flowers* 2–3 in. diam., in few-flowered, axillary and terminal corymbs. *Sepals* pale green, membranous, oblong, outer $1\frac{1}{4}$ in. *Petals* 2 in., yellowish-white, limb suborbicular. *Disk-limb* bright yellow, recurved. *Capsule* 2–4 in., valves brittle.

2. **C. indica,** *Lamk.; DC. Prodr.* i. 244; leaves simple ovate or oblong acute obtuse or mucronate, petals 4 limb oblong, stamens 4, fruit dehiscent. *Wall. Cat.* 6977; *W. & A. Prodr.* 24; *Dalz. & Gibs. Bomb. Fl.* 9. Strœmeria tetrandra, *Vahl; Roxb. Fl. Ind.* ii. 78. Cleome fruticosa, *Linn.*

Western Peninsula, from Guzerat and the Concan southwards, on old walls and in waste dry places.

A straggling much branched shrub, glabrous or pubescent. *Leaves* 1–1½ in. *Flowers* 1 in. diam., greenish white, in few-flowered terminal corymbs; bracts small, subulate. *Sepals* ovate. Claw of *petals* narrow. *Disk* broad, funnel-shaped, smooth, fimbriate. *Fruit* 1–1½ in., cylindric; pulp orange.

3. **C. farinosa,** *Forsk.*; *DC. Prodr.* i. 244; hoary, leaves ovate or oblong obtuse, petals 4 limb narrow spathulate, stamens 5, fruit indehiscent? *Deless. Ic. Sel.* iii. t. 8; *Oliv. Fl. Trop. Afric.* i. 89. C. dubia, *DC. l.c.*

Dry places in the Punjab at Multan, *Edgeworth;* and Sindh, *Stocks.*—Distrib. Arabia, trop. Africa.

A straggling, much branched, wiry shrub. *Leaves* ¼–½ in. rarely 1 in. *Flowers* as in *C. indica* but petals very narrow. *Fruit* ½–1½ in., cylindric—Delessert's Icones represent 6 stamens, we find 5 only.

4. **C. heterotricha,** *Stocks in Hook. Ic. Pl.* t. 839; glaucous and pulverulent, leaves broad obovate or orbicular, petals 4 limb suborbicular, stamens 5.

Sindh; on rocks near Cape Monze, *Stocks.*

A small rigid branched tree, 10–20 ft., young parts often glandular. *Leaves* 1 in. *Flowers* ½ in. diam., in terminal dense corymbs. *Sepals* ovate, acute. *Limb of petals* equalling the claw. *Claw of disk* slender, tubular, limb small, oblong, crenate. *Fruit* unknown.

7. **CAPPARIS,** Linn.

Trees or shrubs, erect decumbent or climbing, unarmed or with stipulary thorns. *Leaves* simple, rarely 0. *Flowers* white or coloured, often showy. *Sepals* 4, free, imbricate in 2 series, or 2 outer subvalvate. *Petals* 4, sessile, imbricate. *Stamens* indefinite, inserted on the torus at the base of the long gynophore. *Ovary* stalked, 1–4-celled; stigma sessile; ovules many, on 2–6 parietal placentas. *Fruit* fleshy, rarely bursting by valves. *Seeds* many, imbedded in pulp, testa crustaceous or coriaceous; cotyledons convolute. —Distrib. Species 120, natives of all warm climates, except N. America.

Sect. I. *Flowers* solitary, axillary. (Flowers sometimes fascicled in 3, *zeylanica*, and 4, *Heyneana.*)

1. **C. spinosa,** *Linn.*; leaves orbicular, pale green not shining acute obtuse or retuse, thorns straight hooked or 0, flowers large, fruit ribbed often dehiscing. *Oliv. Fl. Trop. Afric.* i. 95. (Caper plant.)

Hot Western Himalayan valleys Eastward to Nipal; West. Tibet, ascending to 13,000 ft.; Sindh; Punjab; and Western Peninsula in the Mahableshwar hills.—Distrib. Affghanistan, West Asia, Europe, N Africa, Australia, Sandwich Islands.

A branched shrub, glabrous or hoary, branches prostrate or trailing. *Leaves* 1–2 in., orbicular or broad ovate. *Flowers* white, with purple filaments; pedicels equalling or exceeding the leaves; fruit 1½–2 in., ovoid or oblong.

Var. 1. *galeata;* armed, glabrous, often glaucous, leaves fleshy, anticous sepal very saccate. C. galeata, *Fres.*—Maritime, from Sindh to Arabia, and E. Africa.

Var. 2. *rupestris;* unarmed, leaves suborbicular fleshy. C. rupestris, *Sibth. Flor. Græc.* t. 487; *Wall. Cat.* 7001 (no locality and perhaps not Indian).

Var. 3. *vulgaris;* armed, young parts downy. C. obovata, *Royle Ill.* 73; *Cambess. in Jacq. Voy. Bot.* t. 21. C. Murrayana, *Graham, Cat. Bombay Pl.* 9; *Wight Ill* t. 379; *Dalz. & Gibs. Bomb. Fl.* 9 (C. Ægyptiaca, *Linn.;* C. herbacea, *Willd.*). —The common Indian and Oriental form.

Var. 4. *leucophylla,* DC. Prodr. i. 246 (*sp.*); floccose all over with white pubescence, *Deless. Ic. Sel.* iii. t. 10. C. nepalensis, *Wall. Cat.* 6979.—Confined in India to the lower Himalayan valleys, also Persian.

2. **C. grandiflora,** *Wall. Cat.* 6984; branches tomentose, leaves ovate acute mucronate shining above pubescent beneath, flowers large, pedicels short, ovary glabrous. C. pyrifolia, *W. & A. Prodr.* 25 (*not of Lamk. & DC.*); *Wight Ic.* t. 1047.

Eastern slopes of the Nilghiri Mts., *Wight.*

A dense branched spreading shrub, 2–3 ft.; thorns recurved. *Leaves* 1 in., short-petioled, pubescence brown. *Flowers* 3 in. diam.; pedicels ¼–½ in. *Petals* broadly obovate-cuneate, almost truncate. *Ovary* narrow-oblong, furrowed. *Fruit* 2 in., glabrous, oblong, beaked.

3. **C. zeylanica,** *Linn.* (*not DC. nor W. & A.*); glabrous, armed, leaves broad ovate to lanceolate usually acute and mucronate reticulate beneath, flowers large, pedicels slender, ovary pubescent. *Willd. Sp. Pl.* ii. 1132; *Wall. Cat.* 6789. C. acuminata, *Roxb. Fl. Ind.* ii. 566 (*not Willd.*). C. brevispina, *DC.*; *W. & A. Prodr.* 24; *Thwaites Enum.* 15; *Hook. Ic. Pl.* t. 126; *Dalz. & Gibs. Bombay Fl.* 9. C. Wallichiana, *W. & A. Prodr.* 25; *Wall. Cat.* 6987. (C. Rheedii *and* rotundifolia, *Rottb.*)

Common in the Carnatic and Malabar; occasional in the Western Dekkan; dry parts of Ceylon.

A rigid, wiry, much branched shrub; shoots sometimes puberulous. *Leaves* 1½–3 by ½–1½ in., coriaceous, shining above, sometimes pubescent beneath. *Flowers* 2 in. diam., white, solitary or 2–3 on a short shoot; 2 lower petals yellowish changing to red brown; pedicels 1–2 in. *Ovary* oblong. *Fruit* 2 in., ovoid, smooth.—*C. zeylanica, DC.*, is probably *C. tenera* or *acuminata.*

4. **C. Heyneana,** *Wall. Cat.* 6985; unarmed or thorns minute, leaves ovate or lanceolate acute or acuminate reticulate beneath, flowers solitary or fascicled, pedicels slender 1-bracteate, ovary tomentose. *W. & A. Prodr.* 25. C. formosa, *Dalz. in Hook. Kew Journ.* ii. 40; *Dalz. & Gibs. Bomb. Fl.* 9. —*Rheede Hort. Mal.* vi. t. 57.

From S. Concan and Canara, to Travancor; Ceylon, *Thwaites* (2509 in part).

An erect shrub; young parts floccose. *Leaves* 3–6 by ½–3 in., base acute, coriaceous, old shining above. *Flowers* 4–5 in. diam., white pale blue or lilac, solitary or 2–3; pedicels 1–2 in., terminal; bracts linear. *Sepals* obtuse, tomentose inside. *Petals* obovate, 2 lower close together with a yellow basal spot. *Fruit* (immature) 1½ in., ovoid, beaked.

5. **C. divaricata,** *Lamk.*; *DC. Prodr.* i. 252; glabrous, thorns straight, leaves linear-oblong or ovate obtuse mucronate 5–7-nerved at the base, flowers solitary, pedicels slender, ovary glabrous ribbed. *Wall. Cat.* 6988 *B* (*not A*); *W. & A. Prodr.* 27; *Wight Ic.* t. 889. C. stylosa, *DC.*; *Wall. Cat.* 6980; *W. & A. Prodr.* 25; *Dalz. & Gibs. Bomb. Fl.* 10.

The Dekkan, and Carnatic at Tanjore and Coimbatore.

A shrub or small tree, branches spreading, glabrous or shoots hoary. *Leaves* 1½–3 by ¾–1 in., thick, coriaceous; petiole short. *Flowers* 2½ in. diam.; buds beaked; pedicels ½–1 in. *Sepals* very concave, ovate. *Petals* narrowly obovate-spathulate. *Fruit* 2–3 in. diam., subglobose, 5–6-ribbed, tubercled, obtusely beaked.—Originally described from young plants with slender branches and narrow leaves. Graham describes the flower as red.

Sect. II. *Flowers* umbelled, racemed, corymbose or panicled.

* *Flowers* in simple corymbs (*sometimes compound in* 9, versicolor, *or racemose in* 13, grandis).

6. **C. aphylla,** *Roth*; *DC. Prodr.* i. 246; glabrous, thorns in pairs

straight, leaves (only on young shoots) glabrous linear pungent, buds pubescent, stamens 18–20. *Wall. Cat.* 6983; *W. & A. Prodr.* 27; *Dalz. & Gibs. Bomb. Fl.* 9; *Oliv. Fl. Trop. Afric.* i. 95. (C. Sodada, *Br.*; Sodada decidua, *Forsk.*)

Driest places in the PUNJAB, GUZERAT, RAJPUTANA, the DEKKAN and S. CARNATIC. —DISTRIB. Arabia, Egypt, N. trop. Africa.

A dense much branched shrub; branches slender, glabrous. *Flowers* 1 in. diam., red-brown, in many-flowered corymbs on short lateral shoots. *Outer sepals* subvalvate, ciliate; inner very saccate. *Fruit* ½–⅔ in., glabrous, long-beaked.

7. **C. diversifolia,** *W. & A. Prodr.* 27; glabrous, thorns recurved base broad, leaves glabrous linear or oblong-lanceolate, flowers 1½ in. purple, ovary glabrous. *Hook. Ic. Pl.* t. 181. C. reticulata, *Klein. ex Wall. Cat.* 6986. C. divaricata, *Wall. Cat.* 6988, *A* (*not B*). C. cærulea, *Heyne ex Wall. Cat. l.c.*

WESTERN PENINSULA, in Travancore.

A shrub, branches zigzag, young puberulous. *Leaves* 1½–2 by ¼–¾ in., uppermost usually (rarely all) twice as long and ovate-lanceolate, coriaceous, shining above; petiole ⅙ in. *Flowers* 1½ in., in few-flowered terminal subsessile corymbs; pedicels subclavate, puberulous. *Sepals* ovate, acute. *Petals* broad-obovate. *Ovary* narrow-oblong. *Fruit* 1½ in., ovoid, smooth, many-seeded.

8. **C. trinervia,** *H. f. & T.*; branches brown-tomentose, thorns recurved, leaves glabrous broad-lanceolate 3-plinerved, sepals orbicular tomentose, ovary glabrous.

TENASSERIM, *Helfer*; TAVOY, *Parish.*

Climbing?, branches long. *Leaves* 2–3 by ⅔–1 in.; nervules transverse, few; petiole and midrib brown tomentose. *Flowers* 1½–2 in. diam., in terminal many-flowered corymbs; pedicels 1–1½ in., lower with foliaceous bracts, upper with minute ones. *Ovary* ovoid, acute; gynophore 1½ in. *Fruit* unknown.

9. **C. versicolor,** *Griffith Notul.* iv. 577; branches glabrous, thorns short recurved, leaves glabrous lanceolate or oblong-lanceolate obtusely acuminate obscurely penninerved, sepals ovate glabrous, ovary glabrous.

TENASSERIM, *Griffith.*—DISTRIB. Java.

Climbing; branches flagelliform. *Leaves* 2–3 by ¾–1 in., tip retuse, glabrous and shining above, pale beneath; petiole ¼ in., puberulous. *Flowers* 2 in. diam., white then rose; buds globose, glabrous; corymbs simple, terminal, with the lower flowers axillary, or few-flowered and disposed in lateral racemes 1–1½ in. long; pedicel 1 in. *Outer sepals* very convex, inner petioled. *Ovary* ovoid, gynophore 1½ in.—Perhaps *C. salaccensis*, Blume, of which we have seen no authentic specimen.

10. **C. Moonii,** *Wight Ill.* 35; branches glabrous, thorns recurved, leaves oblong obtuse or subacute with a callous tip glabrous, flowers 4–5 in. diam., sepals orbicular, ovary glabrous. *Thwaites Enum.* 16.

CONCAN, *Stocks*, &c.; CEYLON ascending to 3000 ft.

A large woody climber, branches flagellate. *Leaves* 3–6 by 1½–2¼ in., coriaceous, shining above, pale beneath. *Flowers* white, in 6–12-flowered almost leafless terminal corymbs, with sometimes a solitary axillary flower; pedicels 1–2 in., stout. *Outer sepals* orbicular, convex, much imbricated. *Petals* subpilose. *Gynophore* 3–4 in. *Fruit* 2–4 in. diam., obovoid or subglobose. *Seeds* many, size of a large bean.—Probably a large-flowered state of *C. Roxburghii.* Thwaites' character of the long funicle is altogether inconstant.

11. **C. Roxburghii,** *DC. Prodr.* i. 247; young branches hoary-pubescent, thorns recurved, leaves glabrous obovate-oblong obtuse acute or acuminate, flowers 2 in. diam., sepals orbicular, ovary glabrous. *W. & A.*

Prodr. 26; *Wight Ic.* t. 1048; *Thwaites Enum.* 15; C. corymbosa, *Roxb. Fl. Ind.* ii. 569. C. bisperma, *Wight Cat.* 104 (*not Roxb.*)

Forests of the Western Ghauts and Carnatic.

A large woody climber; pubescence ashy or yellow, minute, deciduous. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ by 1–$1\frac{1}{2}$ in., base acute, shining and glabrous above, pale beneath. *Flowers* white, arranged as in *C. Moonii;* buds usually tomentose. *Petals* broadly obovate-cuneate. *Gynophore* $1\frac{1}{2}$–2 in. *Fruit* 1–2 in. diam., globose.

12. **C. grandis,** *Linn. f.; DC. Prodr.* i. 248; branches pubescent, thorns 0 or recurved, leaves broad-ovate or obovate acute obtuse or retuse silky beneath, buds pubescent, ovary glabrous. *Wall. Cat.* 6996; *W. & A. Prodr.* 27; *Dalz. & Gibs. Bomb. Fl.* 10 C. maximus, *Roth; Wall. Cat.* 6995. C. bisperma, *Roxb. Fl. Ind.* ii. 568; *W. & A. Prodr.* 26 (*excl. syn. Wight Cat. & Klein.*). C. obovata, *Ham.* and racemifera, *DC. l.c.* 248.

Hill forests of the Carnatic, Dekkan, and Ceylon.

A tree. *Leaves* 2–3 by $1\frac{1}{2}$–2 in., base acute, glabrous above and the old on both surfaces; petiole $\frac{1}{2}$–$\frac{2}{3}$ in. *Flowers* $\frac{3}{4}$–1 in. diam., white, in terminal corymbs or racemes, lower with leafy upper with deciduous bracts; pedicels 1 in. *Petals* narrow-obovate, obliquely ascending. *Gynophore* 1 in., sometimes only $\frac{1}{6}$ or $\frac{1}{12}$ in. *Fruit* size of a nutmeg, subglobose, purple, smooth, 2–6-seeded.

** Flowers in simple umbels.

13. **C. orbiculata,** *Wall. mss. in Herb. Linn. Soc.;* branches pilose, thorns recurved from a broad downy base, leaves suborbicular truncate retuse or mucronate papillose and hairy above tomentose beneath, flowers small, ovary glabrous.

Segain hills, Birma, *Wallich, Griffith.*

A much branched rigid spreading shrub. *Leaves* $\frac{2}{3}$–1 in. broad, obscurely trapezoid, base cordate; hairs above papillose; petiole very short. *Flowers* umbelled, peduncle 1–2 in., 1-leaved at the tip; pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., slender, spreading. *Perianth* absent. *Ovary* oblong, acute; gynophore less than $\frac{1}{2}$ in.

14. **C. pedunculosa,**. *Wall. Cat.* 6993; branches pubescent, thorns recurved, leaves glabrous suborbicular obtuse or retuse penninerved, sepals equalling the oblong petals, ovary glabrous. *Hook. Ic. Pl.* t. 128; *Dalz. & Gibs. Bomb. Fl.* 9. C. sepiaria, *Wall. Cat.* 6993, *G.*

Western Peninsula, *Russell;* near Tanjore, in the Carnatic, *Wight;* Concan, *Stocks,* &c.

A spreading branched shrub; branches wiry, at length glabrous. *Leaves* $\frac{3}{4}$–$1\frac{1}{4}$ by $\frac{1}{2}$–1 in., base cordate, shining above; petiole very short. *Flowers* $\frac{1}{2}$–$\frac{2}{3}$ in. diam., in 2–6-flowered terminal or axillary and shortly ($\frac{1}{6}$–$\frac{1}{3}$ in.) peduncled umbels; pedicels 1–$1\frac{1}{2}$ in,. slender. *Sepals* reflexed in flower. *Ovary* oblong; gynophore 1 in. *Fruit* size of a cherry, globose, several-seeded.

15. **C. longispina,** *H. f. & T.;* branches pubescent, thorns long acicular, leaves ovate-cordate acute rarely obtuse pubescent beneath, sepals equalling the oblong petals.

A spreading much-branched shrub; branches slender, wiry, softly pubescent. *Leaves* $\frac{2}{3}$–$1\frac{1}{3}$ by $\frac{1}{2}$–$\frac{3}{4}$ in., glabrous above; petiole very short. *Flowers* exactly as of *C. pedunculosa,* in sessile terminal umbels. *Fruit* (mature ?) size of a pea.—Possibly a state of *C. pedunculosa,* though differing much in thorns pubescence and leaf-form.

16. **C. parviflora,** *H. f. & T.;* branches unarmed, thorns 0, leaves glabrous lanceolate or oblong-lanceolate acute or acuminate, flowers small, buds glabrous, sepals and petals oblong, ovary glabrous.

Shewageri hills in the CARNATIC, *Wight*.

A spreading wiry much branched shrub (or tree?). *Leaves* 1½–3 by ½–¼ in., base narrow but cordate; petiole short, broad. *Flowers* not ½ in. diam., in axillary or subterminal 3–6-flowered subsessile or shortly peduncled umbels; pedicels ¼–½ in., slender. *Petals* oblong. *Ovary* oblong, gynophore ½ in. *Fruit* pisiform.

17. **C. sepiaria,** *Linn.; DC. Prodr.* i. 247; branches hoary or tomentose, thorns recurved, leaves ovate oblong obovate or oblong-lanceolate subacute or retuse penninerved downy (rarely glabrous) beneath, sepals oblong, petals narrow, ovary glabrous. *Roxb. Fl. Ind.* ii. 568; *Wall. Cat.* 6993; *W. & A. Prodr.* 26; *Camb. in Jacq. Voy. Bot.* t. 22; *Dalz. & Gibs. Bombay Fl.* 10.

Dry places throughout India, from the PUNJAB and SINDH to BIRMA, PEGU, the CARNATIC and CEYLON (at Jaffna, *Gardner*).—DISTRIB. Philippines.

A spreading wiry branched shrub. *Leaves* ¾–1¼ by ½–¾ in.; petiole $\frac{1}{12}$ in. *Flowers* ⅓–½ in. diam., white, in many-flowered sessile or shortly peduncled umbels; pedicels slender, ½–¾ in. *Ovary* ovoid, pointed; gynophore ¼–½ in. *Fruit* pisiform, black.

VAR. 1. *vulgaris;* branches softly tomentose, leaves broad.

VAR. 2. *incanescens; DC. Prodr.* i. 247 (sp.), branches rigid wiry, hoary, white, leaves oblong, *Wall. Cat.* 6994; *W. & A. Prodr.* 26; *Hook. Ic. Pl.* t. 123. C. stylosa β. *DC. l.c.*

VAR. 3. *retusella; Thwaites Enum.* 16, 400 (sp.); branches brown-tomentose, leaves ovate or oblong-lanceolate, glabrous beneath, tip tapering retuse, umbels few-flowered, gynophore longer.—Ceylon, near Kandy, *Thwaites*.

*** Flowers in racemose or panicled rarely solitary umbels or corymbs.

18. **C. pumila,** *Champion in Hook. Kew Journ. Bot.* iii. 260; young branches puberulous, thorns recurved, leaves glabrous oblong-lanceolate acuminate, stamens about 20, buds globose glabrous. *Benth. Fl. Hong-Kong* 18. C. punctata, *Wall. Cat.* 7002.

KHASIA HILLS, alt. 2–3000 ft.—DISTRIB. E. China.

A shrub, twigs sarmentose or climbing. *Leaves* 2–3½ by ¾–1¼ in., base acute, obscurely penninerved; petiole ¼ in., pubescent. *Flowers* ½ in. diam.; white, in few-flowered corymbs or umbels arranged in large terminal panicles; pedicel ⅙–¼ in. *Petals* oblong. *Ovary* ovoid-oblong, glabrous; gynophore ¼ in. *Fruit* ½–⅔ in. diam., globose, glabrous.

19. **C. floribunda,** *Wight Ill.* i. 33, t. 14; branches glabrous, thorns 0 or recurved, leaves glabrous oblong rounded at both ends retuse apiculate, stamens about 8, buds globose glabrous. C. malabarica, *Wall. Cat.* 7000. C. oligandra, *Griffith Notul.* iv. 577.

MALABAR, *Heyne;* ORISSA, *Cleghorn;* TENASSERIM, *Griffith*, &c. CEYLON in the Doombesa district, *Thwaites*.—DISTRIB. Philippines.

A large woody climber; branches slender. *Leaves* 3–5 by ¾–1¾ in., coriaceous, shining above, obscurely penninerved below. *Flowers* ½ in. diam., white; umbels many-flowered, in large terminal panicles; pedicels ¼–1 in. *Sepals* reflexed in flower. *Petals* oblong. *Ovary* ovoid, acute; gynophore ½ in. *Fruit* 1 in. diam., globose, smooth, several-seeded.

20. **C. assamica,** *H. f. & T.;* branches glabrous, thorns minute straight or slightly curved, leaves glabrous lanceolate or oblong-lanceolate acuminate reticulate beneath, flowers racemed, buds very small globose.

ASSAM, *Griffith*.

Erect?; branches slender. *Leaves* 4–6 by 1½–2 in., base acute, pale below. *Flowers* in terminal many-flowered racemes, 3–4 in. long, which bear many subulate empty bracts at the base, and at the top a tuft of the same probably enclosing a leaf-bud; buds immature, each in the axil of a subulate bract; pedicel ¼ in. *Sepals* 4, imbricate in pairs.

Sect. III. *Flowers* seriate in vertical lines on the branches.

21. **C. multiflora,** *H. f. & T.;* branches glabrate, thorns 0, leaves large glabrous broad-lanceolate or oblong taper-pointed, flowers small, sepals glabrous.

Tropical valleys in E. Nipal, and Sikkim; Bhotan, *Griffith;* Hookhoom valley in Birma, *Griffith.*

A large woody climber; branches long, slender. *Leaves* 6–12 by 2–5 in., thin, base acute, pale beneath; upper 2–4 in., often bractlike and very deciduous; petiole ½–⅔ in. *Flowers* ½–⅔ in. diam., supra-axillary to the leaf or bracts, forming a leafy or naked 4- or more-flowered raceme; pedicels ¼–½ in. *Petals* obovate-oblong. *Ovary* glabrous. *Fruit* pisiform or larger, 1–3-seeded.

22. **C. horrida,** *Linn. f.; DC. Prodr.* i. 246; young leaves buds and shoots brown-tomentose, thorns stout broad-based recurved, leaves ovate obovate or oblong acute obtuse or mucronate at length shining above, petals oblong ciliate, ovary glabrous acute. *Wall. Cat.* 6981; *W. & A. Prodr.* 26; *Wight Ic.* t. 173; *Dalz. & Gibs. Bombay Fl.* 10. C. zeylanica, *Roxb. Fl. Ind.* ii. 567 (*not of Linn*). C. formosa, *Wall. Cat.* 6982 *A.* C. acuminata, *Willd.; Wall. Cat.* 6990 *C* (*not A or B*). C. tenuiflora *and* quadriflora, *DC. l.c.* 247. C. erythrodasys, *Miq. Fl. Ind. Bat.* i. pt. 2, 99. Capparis sp. *Griff. Ic. Pl. Ind. Or.* iv. t. 698.

Gangetic valley, &c., as far N. as Saharunpore; Western Peninsula, Chittagong to Pegu; Ceylon.—Distrib. Java; Philippines.

Shrubby, climbing. *Leaves* 1½–4 by ¾–2 in., tip pungent, at length shining above and usually much reticulate. *Flowers* 1½–2 in., white or purplish; buds globose; pedicels supra-axillary, ½–1 in., upper longer. *Fruit* 1–1½ in. diam., obovoid or subglobose, smooth, obtusely 4-angled, red-brown, many-seeded.

23. **C. acuminata,** *Willd.; DC. Prodr.* i. 247; young shoots and leaves beneath brown-tomentose, thorns straight or curved, leaves at length glabrous broad-ovate obtusely acuminate, buds globose downy, flowers small. C. zeylanica, *W. & A. Prodr.* 25 (*not of Linn., but perhaps of DC. Prodr.*).

Western Peninsula, Carnatic? *Klein in Herb. Wight.*

Erect?; branches slender. *Leaves* 1½–2 by 1–1¼ in., obtusely acuminate, membranous; petiole ⅙–¼ in. *Flowers* 2–4 in a series, white, axillary; pedicels ½–1 in. downy.—The specimen in Herb. Wight. is the only one known. It differs from *C. horrida* in the thorns and small white flowers. The original ticket bears the manuscript name *ferruginea* of Klein, corrected by himself to *acuminata*, Willd., no doubt from corresponding specimens sent to Europe; the locality is unknown.

24. **C. olacifolia,** *H. f. & T.;* young branches brown-pubescent, thorns straight or slightly curved, leaves glabrous ovate-lanceolate taper-pointed, tip acute obtuse or mucronate, flowers large, buds ovoid glabrous, sepals oblong ciliate, ovary pubescent. C. acuminata, *Wall. Cat.* 6990 *A*, *B* (*not C, nor of Willd.*). Capparis, 1149, Griff. Itin. Notes, 199.

Tropical Himalayan valleys, from Nipal, *Wallich*, to Assam, *Griffith*, &c.

An erect shrub, 6–8 ft.; branches long, leafy, old glabrous. *Leaves* 3–6 by 1–2½ in., base rounded or subacute, shining above, midrib of young puberulous. *Flowers* 1½ in. diam., (white, anthers blue) 2–3 in a series, axillary; buds acute, glabrous or puberulous. *Sepals* margined. *Petals* narrowly obovate-oblong, pubescent. *Fruit* ¾ in. diam., globose, sharply beaked, black, smooth, shining.

25. **C. sabiæfolia,** *H. f. & T.;* branches glabrous, thorns 0, leaves glabrous oblong-lanceolate taper-pointed, pedicels 1–2 supra-axillary.

Khasia hills, alt. 4–6000 ft., *H. f. & T.*

A shrub; branches slender. *Leaves* 3–4 by 1–1½ in., base acute. *Pedicels* about ½ in., slender, flowers unknown. *Fruit* pisiform, 1–2-seeded.

26. **C. viminea,** *H. f. & T.;* branches glabrous, thorns 0 or small conical curved, leaves glabrous abruptly taper-pointed acute or obtuse, sepals ovate margins tomentose, petals oblong tomentose outside.

Tropical valleys of Sikkim, Bhotan, Assam and Tenasserim.

An erect shrub; branches long, slender. *Leaves* 2½–4½ by 1–2 in., thin; petiole ⅓ in. *Flowers* 1 in. diam.; white, 2–5 in a series, axillary, pedicels ½–1 in. *Fruit* ½ in. diam., globose, purple, glabrous, several-seeded.

27. **C. tenera,** *Dalz. in Hook. Kew Journ. Bot.* ii. 41; branches glabrous, thorns hooked, leaves glabrous ovate obovate or oblong acute or abruptly acuminate, flowers small, sepals ovate, margins tomentose, petals tomentose outside.

From Assam to Birma and Tenasserim; Canara, Concan and Ceylon (Kandy, *Thwaites*).

A woody climber, branches slender. *Leaves* 1½–3 by ¾–1½ in, young very thin. *Flowers* ⅓–½ in. diam., 1–3 in a series, axillary; pedicels ⅔–1½ in., slender, glabrous. *Fruit* pisiform, few-seeded. The following vars. all pass one into another.

Var. 1. *Dalzellii;* leaves ovate-lanceolate very membranous, flowers often solitary.—C. tenera, *Dalz. l.c.*

Var. 2. *zeylanica;* leaves ovate, old firm and coriaceous, flowers 2–3 in a series.—C. uncinata, *Wall. Cat.* 6998. C. tetrasperma, *Thwaites Enum.* 15.

Var. 3. *latifolia;* leaves obovate-oblong abruptly acuminate, old coriaceous, flowers 4-6 in a series.—C. oxyphylla, *Wall. Cat.* 6997 (*not of Miquel*).

28. **C. Finlaysoniana,** *Wall. Cat.* 6992 *B* (*not A*); branches glabrous, thorns very small nearly straight, leaves glabrous broad lanceolate obscurely reticulate above, sepals lanceolate acute glabrous.

Singapore, *Wallich*, &c.—Distrib. Sumatra, Borneo.

An erect? glabrous shrub. *Leaves* 6–8 by 1½–3 in.; coriaceous, smooth, shining, pale and yellow when dry below. *Flowers* (buds only) on the young branches supra-axillary, solitary or 2 in a series, appearing racemed when the leaves fall away; pedicels ½–⅔ in. slender. *Fruit* (immature) ovoid-oblong, glabrous, ribbed, long-pedicelled.—Flowers of Bornean specimens rose-coloured. Buds and flowers larger than in *C. micracantha* and leaves not evidently cordate at base.

29. **C. micracantha,** *DC. Prodr.* i. 247; branches glabrous, thorns very small conic straight, leaves oblong or broad-lanceolate shining and very reticulate above, sepals oblong acute ciliate. *Blume Bijd.* 52; *Miq. Fl. Ned. Ind.* i. pt. 2, 99. C. callosa, *Blume l.c.* 53. C. conspicua *and* C. Finlaysoniana, *Wall. Cat.* 6991 *and* 6992 *A* (*not B*).

Pegu, Tenasserim, *Wallich*, &c.—Distrib. Siam, Java, Timor, Philippines.

A large shrub or small tree; bark smooth. *Leaves* 4–8 by 2–3½ in, coriaceous, lower obtuse at both ends, upper narrowed towards the rounded or subcordate base, tip acute callous, pale beneath; petiole ⅓–½ in. *Flowers* 1½ in. diam., 2–4 in a series, supra-axillary; pedicels ½ in. or less. *Petals* 1 in., oblong. *Ovary* glabrous. *Fruit* 2–3 in., ovoid or subglobose, smooth.

Inflorescence unknown.

30. **C. flavicans,** *Wall. Cat.* 7003; branches tomentose, thorns 0, leaves glabrous oblong or obovate-oblong obtuse or retuse and mucronate 3–5 plinerved, fruit solitary.

BIRMA, at Genanghuen and Selainmew, *Wallich.*
Shrubby, branches spreading, tomentum appressed. *Leaves* 1¼–1½ by ¾–1 in., base rounded or subcordate; midrib with 2 oblique veins from about the middle; petiole ⅙ in., pubescent. *Fruit* 1 in., subglobose, tomentose, many-seeded; stalk as long.

31. **C. glauca,** *Wall. Cat.* 7005; branches hoary-pubescent, thorns recurved, leaves glabrous narrow obovate-oblong obtuse or retuse penninerved.

BIRMA, common near Pagodas at Pegamew, *Wallich.*
A shrub; branches rigid, spreading. *Leaves* 1¼–1¾ by ⅓–⅔ in., coriaceous, tapering to the acute base, pale and glaucous beneath; petiole ⅛ in., pubescent. *Flowers* probably umbelled, on stout axillary peduncles about ½ in. long. *Fruit* pisiform, glabrous, 1–2-seeded; stalk ½ in.; gynophore very short.

C. VARIABILIS, *Wall. Cat.* 7004, without flower or fruit, is indeterminable and not a *Capparis.*
C. MOLLIUSCULA, *Wall. Cat.* 7006, is a *Cansjera.*
An undescribed Sikkim species allied to *C. floribunda,* is figured amongst the Cathcart drawings (in Kew Library), with flowers 1½ in. diam., many stamens, and a longer gynophore.

8. ROYDSIA, Roxb.

Large unarmed woody climbers, branches spotted white. *Leaves* simple. *Flowers* yellow, racemed or panicled. *Calyx* 6-partite, segments 2-seriate, tips a little imbricate. *Petals* 0. *Stamens* indefinite, inserted above the base of the short cylindric gynophore. *Ovary* ovoid, 3-celled from the prolongation of the placentas; styles 3, subulate, stigmas small terminal; ovules many, 2-seriate in the angles of the cells. *Fruit* fleshy, with a woody 3-valved 1-celled endocarp, 1-seeded. *Seed* erect, cotyledons fleshy, unequal, longitudinally folded, the larger embracing the smaller.—DISTRIB. Species 3, tropical Asiatic.

1. **R. suaveolens,** *Roxb. Cor. Pl.* iii. t. 289; *Fl. Ind.* ii. 643; leaves oblong or oblong-lanceolate acute or abruptly acuminate, endocarp of fruit smooth. *Wall. Cat.* 4200; *Griff. Notul.* iv. 578.

Tropical forests of SIKKIM, *H. f.*, and BHOTAN, *Griffith;* KHASIA HILLS, *Roxburgh,* &c.
Branches glabrous or slightly pubescent. *Leaves* 6–12 by 2–5 in., glabrous, coriaceous, bright green above, pale below; petiole ⅔–1 in. *Flowers* ⅔ in. diam., pale yellow, sweet-scented, in long simple axillary or panicled terminal racemes; buds tomentose; bracts small, subulate, equalling the short pedicels. *Drupe* 1½ in., ovoid, scurfy, orange-coloured; pulp yellow; stalk short stout.

2. **R. obtusifolia,** *H. f. & T.*; leaves oblong obtuse at both ends, endocarp of fruit triquetrous muricate with long soft prickles.

RANGOON, *M'Clelland.*
Branches glabrous. *Leaves* 3–5 by 1½–2½ in., thickly coriaceous; petiole ⅔ in. *Racemes* in terminal panicles; flowers unknown. *Drupe* 2 in., oblong, scurfy; stalk short, stout.

R. PARVIFLORA, *Griff. Notul.* iv. 578; *Ic. Pl. Ind. Or.* t. 606 f. 6, belongs to *Tiliaceæ.*

ORDER XII. RESEDACEÆ. (By Hooker f. & Thomson.)

Herbs, rarely shrubs. *Leaves* alternate, entire or pinnatisect; stipules 0, or minute and glandular. *Flowers* small, spiked or racemed, bracteate.

Calyx persistent, 4–7-partite, often irregular; sepals imbricate in bud. *Petals* 2–7, hypogynous, entire or lobed, equal or the posticous larger, open in bud. *Disk* conspicuous, hypogynous (0 in *Oligomeris*). *Stamens* usually many, seated on the disk, free or connate, equal or unequal. *Ovary* 1-celled, of 2–6 connate carpels, often lobed at the top and open between the lobes which bear the sessile stigmas; ovules on 2–6 parietal placentas, amphitropous or campylotropous. *Fruit* capsular (a berry in *Ochradenus*), open at the top. *Seeds* many, reniform, albumen 0; embryo curved or folded, cotyledons incumbent.—Distrib. Europe, N. Asia, N. and S. Africa; genera 6; species 20.

Petals 4–7, lobed; ovary syncarpous	1. Reseda.
Petals 2; ovary syncarpous	2. Oligomeris.
Petals 0; ovary syncarpous; fruit a berry	3. Ochradenus.

1. **RESEDA,** Linn.

Herbs. *Leaves* entire, lobed, or pinnatifid; stipules glandular. *Calyx* 4-7-partite. *Petals* 4–7, clawed, unequal, multifid, posticous one with a membrane above the claw. *Disk* broad, dilated posticously. *Stamens* 10–40. *Ovary* sessile or stalked; placentas 3. *Capsule* many-sided, open at the top. —Distrib. Species 26, N. Africa, W. Asia.

The European *R. luteola* is found in Affghanistan, and *R. odorata* (mignonette), (*R. nilgherrensis*, J. Mull. Monog. Resed. 131), is commonly cultivated.

1. **R. pruinosa,** *Delile Fl. Ægypt.* 152; papillose, lower leaves lanceolate, upper 3–5-partite, flowers very small subsessile, bracts minute. R. bracteata, *Boiss. Fl. Orient.* 433; *J. Mull. Monog.* 154.

Hills in the Western Punjab, *Vicary*, &c.—Distrib. Eastward to Egypt.

An erect perennial, 1–1½ ft. *Leaves* 1–2 in., upper with linear segments. *Racemes* terminal, 6–9 in., dense; bracts subulate, deciduous. *Capsules* oblong or ovoid, short, widely gaping.

2. **R. Aucheri,** *Boiss.*; *Fl. Orient.* i. 434; glabrous or slightly papillose, leaves obovate-spathulate acute or obtuse, flowers small, bracts linear-lanceolate. *J. Mull. Monog.* 146.

Sindh, *Stocks*.—Distrib. Eastwards to Persia.

A branched perennial, 1–2 ft. *Leaves* 1–2 in., tapering into a long petiole. *Racemes* terminal, dense; flowers yellowish. Capsules as in *R. pruinosa*.

2. **OLIGOMERIS,** Cambess.

Herbs. *Leaves* linear, fascicled. *Flowers* small, spiked. *Calyx* 4-partite. *Petals* 2, free or connate. *Disk* 0. *Stamens* 3–8, free or monadelphous. *Ovary* 4-lobed, top open, placentas 4; ovules many. *Capsule* subglobose, angled, 4-pointed.—Distrib. Species 4; 3 S. African, and the following.

1. **O. glaucescens,** *Cambess. in Jacq. Voy. Bot.* 23, t. 25; leaves narrow-linear, stipules minute subulate, spike dense-flowered, flowers minute, capsule deeply 4-lobed. O. dispersa β, *J. Mull. Monog.* 215. Reseda oligandra, *Edgew. in Journ. As. Soc. Calc.* vii. 764, and *Hook. Lond. Journ. Bot.* ii. 203.

Sindh, and Punjab, from the Jumna eastward, common; rare in the Concan hills.—Distrib. Westward to Spain and the Canaries.

An annual, erect; glaucous, much branched herb, 6–12 in.; branches erect. *Leaves* 1-2 in. *Spikes* terminal; flowers greenish-white. *Capsule* very small, membranous. *Seeds* minute, shining.

3. OCHRADENUS, Delile.

Much branched shrubs; branches slender. *Leaves* small, linear. *Flowers* spiked or racemed, often polygamous. *Calyx* 5-partite. *Petals* 0. *Disk* unilateral. *Stamens* 10–20, inserted within the disk. *Ovary* ovoid, closed at the top, 3-beaked; ovules many, on 3 placentas. *Berry* many-seeded.—DISTRIB. Species 2, a Spanish and the following.

1. **O. baccatus,** *Delile Fl. Æg.* 15, t. 31, f. 1; leaves fleshy scattered linear-spathulate, racemes terminal, flowers minute. *J. Müll. Monog.* 94; *Boiss. Fl. Orient.* i. 422; *Griff. It. Notes* 228, No. 208.

SINDH, *Vicary* &c.—DISTRIB. Westwards to Syria and Egypt.

Shrubby, 6–12 ft.; branches glabrous, leafless when old. *Leaves* ½–1½ in.; stipules minute or 0. *Racemes* rigid; flowers yellowish, 1–2-sexual. *Stamens* 10–12. *Berry* small, white. *Seeds* few, large.

ORDER XIII. VIOLACEÆ. (By Hooker f. & Thomson.)

Herbs or shrubs. *Leaves* alternate, entire or pinnatisect, stipulate. *Flowers* regular or irregular, 2-bracteolate. *Sepals* 5, persistent, equal or unequal, imbricate in bud. *Petals* 5, hypogynous, equal or unequal, imbricate or contorted in bud. *Stamens* 5, filaments short, broad; anthers free or connate, connective broad, produced beyond the cells. *Ovary* sessile, 1-celled; style simple, stigma capitate truncate or cupular entire or lobed; ovules many, on 3 parietal placentas, anatropous. *Fruit* a 3-valved capsule, rarely a berry. *Seeds* small, albumen fleshy; embryo straight, cotyledons flat.—DISTRIB. Genera 21, species 240; natives of temp. and trop. regions.

TRIBE I. **Violeæ.** *Corolla* irregular; lower petal dissimilar. *Staminodes* 0. *Capsule* loculicidal.

Sepals produced at the base	1. VIOLA.
Sepals not produced at the base	2. IONIDIUM.

TRIBE II. **Alsodeieæ.** *Corolla* regular. *Staminodes* 0. *Fruit* a berry or loculicidal capsule.

3. ALSODEIA.

1. VIOLA, Linn.

Herbs, rarely shrubby below. *Flowers*, on 1-, rarely 2-flowered peduncles, often dimorphic, some large petalled which ripen few seeds, others small petalled or apetalous and very prolific. *Sepals* produced at the base. *Petals* erect or spreading, lower largest, spurred or saccate at the base. *Anthers* connate, connectives of two lower often spurred at the base. *Style* clavate or truncate, tip straight or oblique, stigma obtuse lobed or cupular. *Capsule* 3-valved. *Seeds* ovoid or globose.—DISTRIB. Species about 100, all temp. regions.

The Pansy or Heartsease (*Viola tricolor*) occurs occasionally in India, as an escape from cultivation.

* Stigma obliquely 2-lobed, not beaked; lobes short, spreading.

1. **V. biflora,** *L.*; glabrous or pubescent, leaves reniform, stipules ovate or oblong, flowers yellow, sepals linear-obtuse, spur very short. V.

Wallichiana, *Ging. in DC. Prodr.* i. 300. V. reniformis, *Wall. Cat.* 1443; *Royle Ill.* 74, t. 18, f. 2; *Roxb. Fl. Ind. Ed. Wall.* ii. 457.

TEMPERATE HIMALAYA from Kashmir to Sikkim, alt. 6–11,000 ft.—DISTRIB. N. Asia, Caucasus, Europe.

Rootstock slender. *Stem* 3–12 in., erect or decumbent. *Leaves* 1–2 in. diam., crenate, cauline 2–3.

** Stigma terminal, truncate, dilated depressed orbicular or lobed.

2. **V. Patrinii,** *DC. Prodr.* i. 293; glabrous or pubescent, stemless, without stolons, leaves triangular-ovate oblong or linear-crenate or serrate, base hastate cordate or cuneate, stipules linear adnate, flowers lilac, sepals lanceolate, spur saccate. *Wall. Cat.* 1445. V. primulifolia, *Linn. in part; Roxb. Fl. Ind.* i. 650. V. grandifolia *and* V. mysorensis, *Wall. Cat.* 1446, 1447. V. chinensis *and* V. cæspitosa, *Don Prodr.* 205. V. nilagirica, *Turc. in Bull. Mosc.* xxxvi. 536. V. Walkerii, *Wt. Ill.* i. 42, t. 18. V. Patrinii *var.* nepaulensis, *DC. l.c.*

TEMPERATE HIMALAYA, alt. 4–8000 ft. from Kashmir to Bhotan; WESTERN TIBET; KHASIA HILLS; hills of the WESTERN PENINSULA and CEYLON.—DISTRIB. Affghanistan, N. Asia, Japan, Mid. Russia.

Very variable. *Rootstock* woody. *Leaves* very variable, largest 3–4 by 1–2 in., narrowest 3–4 by ½–1 in.; petiole 2–4 in., often winged. *Stipules* entire. *Flowers* ⅓–½ in. diam. *Style* nearly straight, slender; stigma 3-lobed, margined. *Capsule* straight, ¼–½ in.; valves narrow, acute.

3. **V. diffusa,** *Ging. in DC. Prodr.* i. 298; softly hairy, stemless, stoloniferous, leaves elliptic-ovate obtuse crenate base cuneate rarely cordate, stipules free narrow toothed, sepals subacute, spur globose. *Wall. Cat.* 1444. V. tenuis, *Benth. in Hook. Lond. Journ. Bot.* i. 482.

SUBTROPICAL HIMALAYA from Nipal to Mishmi, in fields, alt. 3–5000 ft.; KHASIA MTS.—DISTRIB. China.

Perennial. *Leaves* tufted, 1–1½ in., pale green; petiole broadly winged, rarely equalling the blade. *Stolons* short, sometimes floriferous. *Flowers* pale-purple. *Style* slender, narrowed-downwards from the 2-lobed margined obscurely beaked stigma.

4. **V. Hookeri,** *T. Thoms.;* glabrous or young parts pilose, stem and stolons short, leaves orbicular-reniform broadly crenate, petiole not winged, stipules narrow free toothed or lacerate, sepals obtuse or acute, spur saccate.

EASTERN HIMALAYA; Bhotan, alt. 6–7000 ft., *Griffith;* Sikkim, alt. 8–11,000 ft. *H. f.*

Rootstock slender. *Leaves* ½–1½ in., rather fleshy, crenatures very broad and shallow; petiole 1–3 in., slender. *Flowers* white or very pale blue, small. *Style* slender, narrowed downwards from the 3-lobed obscurely beaked stigma. *Capsules* small.—Perhaps two species are mixed here, and if so they occur in both the Sikkim and Bhotan collections; one is small, very hairy when young, with more reniform leaves and shorter obtuse sepals; the other is larger, almost wholly glabrous, with more ovate minutely gland-dotted leaves having rounded sometimes overlapping basal auricles, and acute sepals; of this latter some of Griffith's specimens are marked as from East Bengal (Khasia hills), but through an obvious transposition of tickets.

5. **V. distans,** *Wall. Cat.* 4022, *and in Trans. Med. Phys. Soc. Calc.* vii. 227; glabrous or nearly so, stolons or stems usually long leafy and flowering, leaves ovate- or deltoid-cordate usually acute crenate-serrate, stipules entire or fimbriate, sepals acute, spur saccate, capsule linear-oblong

many-seeded. V. Wightiana *var.* glabra, *Thwaites Enum.* 20. V. Notoniana, *Wall. Cat.* 1449. V. Metziana, *Hohen. Pl. Exsicc.* No. 1501.

TEMPERATE HIMALAYA, from Nipal to Bhotan, alt., 5–10,000 ft.; KHASIA HILLS, alt. 4–6000 ft. PULNEY and NILGHIRI MTS.; CEYLON, alt. 6–7000 ft.—DISTRIB. Java?

Rootstock, slender or stout. *Stems* 1–14 in., usually long and trailing. *Leaves* ¾–1½ in., very variable, sinus broad or narrow, shallow or deep; petals not winged. *Flowers* ⅓–½ in. diam., pale lilac or blue. *Style* slender, narrowed downwards from the obscurely 3-lobed stigma. *Capsule*, ⅓–½ in., valves acute.—It is very difficult to distinguish this from *V. serpens*, by leaf or flower, and the characters of the stigma and fruit are probably sexual; some of the synonyms quoted under each may apply to the other.

VAR. 1. *distans proper;* stipules nearly entire. V. serpens, *Wall. Cat* 1441 (*not of Fl. Ind.*). ? V. palmaris, *Buch in DC. Prodr.* i. 298, *Don Prodr.* 205.—Nipal, Khasia hills.

VAR. 2. *fimbriata;* stipules lacerate or fimbriate.—Sikkim.

VAR. 3. *acaulis;* stemless, stipules fimbriate.—Sikkim, alt. 7–9000 ft.

*** Stigma very oblique or quite lateral, often minute and perforated.

6. **V. serpens,** *Wall. in Roxb. Fl. Ind. Ed. Wall.* ii. 449 (*not. of Cat.*), *and in DC. Prodr.* i. 296; hirsute or glabrous, stolons or stems usually long leafy and flowering, leaves ovate-cordate obtuse or acute crenate-serrate, stipules toothed or fimbriate, spur saccate, sepals acute, capsules globose few-seeded. *Royle Ill.* 74, t. 18, f. 1; *W. & A. Prodr.* 32. V. Wightiana, *var.* pubescens, *Thwaites Enum.* 20. V. pilosa, *Blume, Bijd.* 57.

Moist woods, &c., throughout the TEMPERATE HIMALAYA, KHASIA HILLS, PULNEY and NILGHIRI MTS., and CEYLON, alt. 5–7000 ft. ? MOULMEIN, *Parish.*—DISTRIB. Java, China.

Leaves 1–2 in., sinus open or closed, shallow or deep. *Flowers* from the main-stem ¼–½ in. diam.; those from the axils of the cauline leaves small or minute. *Capsules* often pubescent.—As variable in habit and foliage as *V. distans*, from which the stigma alone distinguishes the glabrous forms when these are not in fruit, and we suspect that these differences are sexual, the stigmas of the smaller fertile flowers appearing to be more truncate than those of the large flowers. The N. W. India specimens are shorter-stemmed than those from moister districts. *V. Griffithiana,* Boiss., of Affghanistan differs in the more cylindric spur and swollen style above with rounded top, and in the more evident beak. *V. hirta*, L., differs chiefly in the latter character and obtuse sepals.

VAR. 1. *glabra;* glabrous and very stoloniferous. ? V. Hamiltoniana, *Don Prodr.* 206.

VAR. 2. *canescens, Wall. Cat.* 1442 (*sp.*), *and in Roxb. Fl. Ind. Ed. Wall.* ii. 450; often stemless, hoary or pubescent. V. Wightiana, *Wall. Cat.* 4021. V. Royleana, *Wall. Cat.* 1448. V. griffithiana, *Boiss; Fl. Orient.* i. 456.

VAR. 3. *confusa, Benth. Fl. Hongk.* 20 (*sp.*); stemless or nearly so, stolons 0. V. Wightiana, *Wt. Ic.* t. 943. V. aspera, *Ging. in DC. Prodr.* i. 295.

7. **V. odorata,** *L.;* glabrate or pubescent, stem 0, stolons slender, leaves tufted broadly ovate-cordate obtuse crenate, stipules entire or toothed, sepals very obtuse, spur nearly straight short subcylindric, style inflated above, stigma decurved. *Boiss. Fl. Orient.* 458. (Sweet Violet.)

KASHMIR, alt. 5–6000 ft., *Falconer, T.T.*—DISTRIB. Europe, N. Africa, N. and W. Asia.

Rootstock stout. *Stems* very short or 0. *Leaves* (in the Kashmir plant) ½–1 in. diam., tip rounded, nearly glabrous; stipules subulate-lanceolate. *Sepals* rounded at the tip.

8. **V. canina,** var. *sylvatica, Fries.* (*sp.*); rootstock short or 0, flowering stems from a short central axis, leaves ovate-cordate obtuse crenate-serrate, stipules leafy fimbriate, sepals acute or acuminate, spur straight or hooked, style of *V. odorata. Boiss. Fl. Orient.* i. 459.

Kashmir and Kishtwar, alt. 4–8000 ft. *Jacquemont,* &c.—Distrib. N. Asia, and westward to the Atlantic.

Best distinguished from *V. odorata* by the acute or acuminate sepals.

9. **V. Falconeri,** *H. f. & T.*; stem 0 or very short, stolons or branches stout erect 6–10 in., leaves large ovate-cordate very broadly crenate and very large foliaceous toothed stipules densely covered with black glands, flowers $\frac{3}{4}$ in. diam., sepals subulate-lanceolate, spur saccate, anther-spurs exceeding the cells.

Kashmir, *Falconer.*

A very remarkable species, resembling *V. acuminata* Led. (a form of *canina*), of Siberia and Manchuria, but with much larger flowers and gland-dotted leaves.

10. **V. kunawarensis,** *Royle Ill.* 75, t. 18, f. 3; small, glabrous, stemless, stolons 0, leaves tufted oblong obtuse subentire base cuneate, sepals short tips rounded, spur short obtuse, style clavate, stigma subhorizontal hardly beaked.

Western Tibet and Tibetan Himalaya, from Kumaon to Balti, alt. 11–15,500 ft.—Distrib. Affghanistan.

Rootstalk slender, woody, much branched. *Leaves* tufted, $\frac{1}{3}$–$\frac{3}{4}$ in., tapering into the slender petiole, pale green. *Flowers* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., purple. *Capsules* elliptic, acute.

11. **V. cinerea,** *Boiss.; Fl. Orient.* i. 454; small, glabrous, stems short diffuse branched, leaves elliptic-ovate or -lanceolate acute obscurely crenate, base acute, stipules leafy fimbriate, flowers small axillary, sepals lanceolate aristate, spur very short, style clavate compressed, stigma lateral of 2 oblong parallel disks.

Dry hilly region of the Punjab and Sindh, common.—Distrib. Affghanistan, Persia, Arabia.

Slightly powdery. *Stems* 1–6 in. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., apiculate, petioles as long. *Peduncles* slender, bracts subulate. *Flowers* $\frac{1}{4}$ in. diam. *Capsules* $\frac{1}{5}$–$\frac{1}{4}$ in., elliptic, acute.

V. apetala, *Roxb.? Wall. Cat.* 1440 resembles an apetalous form of *A. Patrinii.*

V. dubia, *Wall. Cat.* 1450, is probably a form of *V. serpens.*

2. IONIDIUM, Ventenat.

Herbs or undershrubs. *Leaves* alternate, rarely opposite. *Flowers* axillary, orange or purple. *Sepals* 5, subequal, not produced at the base. *Petals* 5, lower larger, clawed, saccate or spurred at the base. *Anthers* connate or free, 2 or 4 of them gibbous or spurred at the back. *Ovary* ovoid; style clavate, incurved, stigma oblique. *Capsule* 3-valved, subglobose, few-seeded. *Seeds* globose, testa crustaceous.—Distrib. Species about 40, chiefly tropical American.

1. **I. suffruticosum,** *Ging. in DC. Prodr.* i. 311; glabrous or pubescent, leaves linear or lanceolate serrate-toothed, flowers solitary. *Wall. Cat.* 1439; *W. & A. Prodr.* 32; *Wight Ill.* t. 19; *Ic.* t. 308. I. enneaspermum, *DC.; Wall. Cat.* 1438; *W. & A. Prodr.* 33. I. Wightianum, *Wall. Cat.* 4020. I. leptorhizum, *DC.; W. & A. l.c.* I. heterophyllum *and* erectum, *DC. l.c.* 308, 311. I. hexaspermum, *Dalz. in Hook. Kew Journ.* iv. 342; *Bomb. Fl.* 12. Viola suffruticosa *and* enneasperma, *Roxb. Fl. Ind.* i. 649; *Ed. Wall.* ii. 447. V. frutescens *and* erecta, *Roth. Nov. Sp.* 168.

Abundant from Bundelkund and Agra, to Bengal and Ceylon.—Distrib. Tropical Asia, Africa, and Australia.

Very variable, 6–12 in., perennial; branches diffuse, woody. *Leaves* $1\frac{1}{2}$–2 by $\frac{1}{12}$–$\frac{1}{3}$ in., subsessile; stipules subulate, gland-tipped. *Flowers* red; pedicels shorter than the leaves. *Petals* variable, 4 oblong acute or mucronate, the 5th with a long claw, and large oval or orbicular limb. *Seeds* striate.

2. **I. ramosissimum,** *Thwaites Enum.* 21; leaves closely imbricate narrow-linear quite entire glaucous, flowers solitary.

Ceylon, banks of the Mahawelliganga at Havagam, *Thwaites.*

Shrubby, suberect, 6–8 in., branches suberect. *Leaves* 1–$1\frac{1}{2}$ in., mucronate, veinless, margins recurved. *Flowers* as in *I. suffruticosum.*

3. ALSODEIA, Thouars.

Trees or shrubs. *Leaves* alternate (rarely opposite), distichous; secondary nerves often numerous and parallel. *Stipules* rigid. *Flowers* small, axillary or terminal, solitary fascicled cymose or racemose, regular; peduncles with many bracts. *Sepals* 5, subequal, rigid. *Petals* 5, subequal, sessile. *Stamens* 5, inserted inside or on an annular disk; connective produced into a long or short often broad membranous appendage. *Ovary* ovoid; style straight, stigma terminal; ovules few or many. *Capsule* 3-valved, few-seeded. *Seeds* glabrous in the E. Ind. species.—Distrib. Species about 40, chiefly tropical American.

Sect. I. **Doryctandra,** *Hassk.* (Gen.). *Stamens* exserted, filaments slender; anthers cohering in a cone.

1. **A. Roxburghii,** *Wall. Cat.* 7189 (Pentaloba?); branchlets pubescent on one side, leaves glabrous small elliptic or cuneate lanceolate obtuse subcrenate perforate at the nerve axils beneath, flowers fascicled glabrous. *Arn. in Mag. Zool. and Bot.* ii. 343. Vareca heteroclita, *Roxb. Fl. Ind.* i. 648. Doryctandra Roxburghii, *Hassk. in Retzia* i. 126.

Oude, *Genl Martin*; Silhet, *Wallich*; Andamans, *Kurz.*

A small shrub; branchlets compressed. *Leaves* 1–$1\frac{1}{2}$ by $\frac{1}{2}$–$\frac{3}{4}$ in., sessile, pale beneath, nerves few, venules obsolete. *Stipules* $\frac{1}{3}$ in., subulate from a broad base. *Flowers* subsessile, $\frac{1}{10}$ in. diam., white. *Sepals* unequal, obtuse. *Petals* linear, tips revolute. *Disk* 10 toothed. *Filaments* glabrous; anthers white, narrow-linear, almost as long as the filaments, base of cells tomentose; appendage oblong, obtuse. *Ovary* glabrous; style filiform, pubescent. *Capsule* 1- few-seeded.

Sect. II. *Stamens* included; anthers free. *Disk* cupular.

* Ovary and style glabrous.

2. **A. bengalensis,** *Wall. in Trans. Med. and Phys. Soc. Calc.* vii. 224; glabrous, leaves elliptic-lanceolate serrulate, nerve-axils beneath bearded, stipules slender, flowers fascicled, filaments very short, tip of connective short broad. Pentaloba? bengalensis, *Wall. Cat.* 4896; *Arn. in Mag. Zool. and Bot.* ii. 542.

Silhet, *Wallich, Griffith*; Andamans, *Kurz.*

A shrub or small tree? *Leaves* 3–5 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., shining, tip obtuse; petiole $\frac{1}{8}$ in. *Stipules* $\frac{1}{2}$ in., narrow lanceolate. *Peduncles* $\frac{1}{4}$–$\frac{1}{2}$ in., 1-flowered, glabrous or puberulous; bracts minute, basal, ovate, subacute. *Flowers* $\frac{1}{6}$ in. diam., glabrous. *Sepals* broad, ovate, $\frac{1}{3}$ the length of the oblong-ovate petals. *Disk* thick, 5-lobed. *Anthers* glabrous, oblong. *Capsule* $\frac{1}{3}$ in., quite glabrous, 3–4-seeded.

3. **A. zeylanica,** *Thwaites Enum.* 21; branchlets puberulous, leaves elliptic-lanceolate obscurely serrulate, nerve-axils beneath bearded, stipules broad-subulate, flowers fascicled, filaments very short, tip of connective short broad. Pentaloba zeylanica, *Arn. in Mag. Zool. and Bot.* ii. 543.

Malabar, *Herb. Wight.;* Cochin, *Johnstone;* Ceylon, in the Ratnapoora district, *Gardner*, &c.

Very closely allied to *A. bengalensis* and perhaps a variety of it, but the branchlets are puberulous, the stipules broader, the leaves more obscurely serrulate, the flowers on shorter pedicels, that are crowded on stout peduncles, and the petals are more linear.—*A. obtusa*, Korth, and *A. Brownii*, Korth, come very near to this and *A. bengalensis.*

4. **A. Wallichiana,** *H. f. & T.;* quite glabrous, leaves petioled large linear- or oblong-lanceolate acuminate obscurely serrulate, nerve-axils beneath not bearded, flowers 2–3 together axillary peduncled quite glabrous. Pentaloba macrophylla, *Wall. Cat.* 4024.

Penang, *Porter.*

Branches stout. *Leaves* 7–12 by 3–4 in., coriaceous, shining, yellow when dry; nerves strong, many, arching; petiole stout ½–¾ in. *Stipules* ½–⅔ in., linear-lanceolate, glabrous. *Peduncles* ⅓–2⅓ in., usually 2 together, glabrous, with many small ovate-subulate basal bracts and bracteoles. *Flowers* ⅓ in. diam., erect. *Sepals* ovate, acute, very rigid, glabrous. *Petals* ovate-oblong, rigid, twice as long as the sepals. *Disk* cupular, membranous, entire or obscurely 5-lobed. *Filaments* subulate, flattened, dilated below, adnate to the disk; anthers oblong, cells gibbous at the outer base, tip of connective suborbicular broader than the cells. *Ovary* globose; style glabrous, short, stigma truncate 3-lobed; ovules 6. *Capsule* ½ in., glabrous.

5. **A. racemosa,** *H. f. & T.;* glabrous, leaves elliptic or elliptic-obovate acuminate serrulate, nerve-axils beneath not bearded, petiole puberulous, flowers in erect axillary racemes, filaments subulate.

Assam, *Herb. Griffith.*

Branches strict, glabrous. *Leaves* 3–4 by 1¼–1¾ in., rather oblique, membranous, base subacute; nerves slender, arching; petiole ¼ in., slender. *Stipules* ⅒ in., ovate, acuminate. *Racemes* 2–3 in., simple, erect, strict, stout, flowering throughout their length; bracteate and 2 bracteolate at the base of each short pedicel; bracts like the stipules, persistent, bracteoles minute. *Flowers* horizontal, ⅛ in. diam. *Sepals* ovate, subciliate. *Petals* twice as long, oblong, obtuse. *Filaments* subulate, connate at the base with the disk into a cup, glabrous; anthers ovate, tip of connective broad, subacute, cells hairy at the base. *Ovary* 6-ovuled.

** Ovary and style pubescent or tomentose.

† *Leaves glabrous or nearly so.*

6. **A. Griffithii,** *H. f. & T.;* branchlets and petioles puberulous, leaves elliptic-oblong acuminate serrulate glabrous, nerve-axils beneath bearded, flowers fascicled on short branched peduncles, filaments very short, tip of connective broad orbicular.

Birma, near the Serpentine mines in the Hookoom valley, *Griffith.*

Branches stout. *Leaves* 8–10 by 3–4 in., shining above, midrib beneath with a few short hairs or glabrous; petiole ½ in., stout. *Stipules* ½ in., oblong-lanceolate, hard, pubescent. *Peduncles* clustered, very stout. *Flowers* crowded, ⅕ in. diam., pubescent. *Sepals* broadly ovate, half as long as the petals. *Disk* fleshy, 5-lobed. *Filaments* very short; anthers with a short spur at the outer base of each cell, and a very large orbicular membranous ciliolate tip to the connective, which is broader than the anther. *Ovary* and style hairy.—This resembles a Philippine Island species (Cuming, n. 1074) which has glabrous flowers, also the *A. macrophylla*, Don. (of Timor) which has an acuminate tip to the connective.

7. **A. lanceolata,** *Wall. Cat.* 4023 (Pentaloba); glabrous, leaves narrow-lanceolate acuminate obscurely serrulate, nerve-axils beneath unbearded, flowers in short cymes pubescent, filaments longer than the anthers, tip of connective subulate. Vareca lanceolata, *Roxb. Fl. Ind.* i. 648.

PENANG, *Jack.*, *Porter*, &c.

An erect shrub. *Leaves* 5–7 by 1–2 in., smooth and shining on both surfaces, subsessile, base narrowed. *Stipules* ¼ in., subulate from a broad base, or lanceolate, glabrous. *Flowers* pale yellow, shortly pedicelled. *Sepals* ovate, obtuse. *Petals* twice as long, linear lanceolate, subacute. *Filaments* glabrous, adnate to the 5-lobed disk; anthers ovate, contracted into the acuminate tip of the connective. *Ovary* and style densely villous. *Capsule* ½ in., pubescent or glabrate, several-seeded.

8. **A. Maingayi,** *H. f. & T.*; glabrous, leaves subsessile elliptic or elliptic-lanceolate or obovate-oblong shortly acuminate serrulate, nerves strong, axils beneath not bearded, flowers in peduncled axillary cymes crowded pubescent, sepals oblong, stamens tomentose.

MALACCA, *Griffith*, *Maingay.*

A tree? *Leaves* very variable in size and shape, the longest narrow lanceolate, 10 by 2 in.; the broadest 5 by 3 in., shortly oblong tending to become obovate, often somewhat oblique, base rounded or acuminate, young pilose; nerves many, strong, arching and inosculating within the margin. *Stipules* ½ in., subulate-lanceolate. *Cymes* with stout glabrous peduncles ½–1 in. long, dichotomously branched. *Flowers* ⅓ in. diam., sessile or pedicelled. *Sepals* broadly oblong, ciliolate. *Petals* rather longer, obtuse, bearded down the centre on both surfaces. *Filaments* adnate to the cup-shaped 10-lobed disk, broad, stout, tomentose within; anthers small, ovoid, connective pubescent, with a glabrous short obtuse membranous tip.

†† *Branchlets and leaves tomentose.*

9. **A. mollis,** *H. f. & T.*; softly tomentose, leaves obovate- or oblong-lanceolate acuminate obscurely toothed, flowers in dense axillary tomentose cymes, outer sepals large orbicular, filaments pubescent above.

TENASSERIM, *Griffith*, *Helfer.*

A shrub, branches and leaves thickly tomentose beneath with short spreading hairs. *Leaves* 6–10 by 2–2½ in., acute or acuminate, often oblique, membranous, pubescent above with a tomentose midrib; petiole ⅓ in. *Stipules* ¼–⅓ in., subulate-lanceolate, pilose. *Cymes* peduncled or subsessile. *Flowers* ⅓ in. diam., subsessile, crowded, ochreous. *Sepals* very unequal, inner oblong. *Petals* narrow, erect, rigid, with revolute tips, hairy upwards. *Filaments* inserted on the cupular 10–15-lobed disk; anthers shorter, ovate, narrowed into the short acute tip of the connective. *Ovary* 6-ovuled. *Capsule* ¼ in., densely pubescent.—Very near *A. dasycaula*, Miquel, of Sumatra, but much more densely tomentose.

10. **A. echinocarpa,** *Korthals. in Ned. Kruidk. Arch.* i. 359; densely tomentose, leaves obovate or oblong-lanceolate long acuminate usually coarsely toothed, flowers in densely tomentose axillary cymes, outer sepals oblong, capsules thickly clothed with felted brown-tomentose branched fibres. *Miquel Fl. Ned. Ind.* i. pt. 2, 116. Medusa anguifera, *Lour. Fl. Coch.* 406.

MALACCA, *Griffith*, *Maingay.*—DISTRIB. Sumatra, Cochin-China.

Very similar to *A. mollis* in foliage, stipules, and structure of the flowers, disk, stamens and ovary, but the leaves are shorter-petioled and usually more deeply toothed, the cymes shorter, the sepals all oblong, filaments glabrous, and the fruits form spherical balls 1–2 in. diam. of matted branched filaments which arise from the capsule, whose valves are ⅔ in. long. *Seeds* few, large.

SECT. III. **Scyphellandra,** *Thwaites* (Gen.). *Stamens* included; anthers free. *Disk* reduced to 5 scales, one at the back of each anther.

11. **A. virgata,** *Thwaites* (Scyphellandra); twigs pubescent with curled hairs, leaves small petioled ovate or oblong toothed glabrous obtuse at both ends.

Hot dry parts of CEYLON, *Thwaites.*

A small shrub. *Leaves* very variable, ⅓–1½ in.; petiole pubescent. *Stipules* minute, lanceolate. *Flowers* subsolitary, axillary, peduncled or subsessile, ⅓ in. diam., whitish. *Petals* sessile, linear-oblong, twice as long as the broadly ovate obtuse ciliolate sepals. *Anthers* subsessile, tip of the connective petaloid, much exceeding the cells, ovate, subacute. *Ovary* small, glabrous; style slender, stigma minutely 3-lobed; ovules one on each placenta. *Capsule* 3-valved. *Seeds* subglobose.

ORDER XIV. BIXINEÆ. (By Hooker f. & Thomson.)

Trees or shrubs. *Leaves* alternate; stipules minute or 0. *Inflorescence* various. *Flowers* regular, 1–2-sexual. *Sepals* 4–5, rarely 2–6, imbricate, free or connate and bursting irregularly, usually deciduous. *Petals* 4–5 or 0, imbricate or contorted in bud, deciduous. *Stamens* usually hypogynous; anthers 2-celled, bursting by slits or pores. *Disk* thickened, often glandular. *Ovary* 1-, rarely several-celled; style and stigmas free or united; ovules parietal, amphitropous or anatropous. *Fruit* dry or fleshy, indehiscent or valvular, valves bearing the seeds in the middle. *Seeds* arillate or testa pulpy, albumen fleshy; embryo axile, cotyledons foliaceous often cordate.—DISTRIB. Chiefly tropical; genera 30; species 160.

TRIBE I. **Bixeæ.** *Petals* broad, contorted, without a scale or basal appendage. *Anthers* bursting by pores or short slits.

Capsule almost 3–5-celled. Leaves compound	1. COCHLOSPERMUM.
Capsule 2-valved. Leaves simple	1* BIXA.

TRIBE II. **Flacourtieæ.** *Petals* small, imbricate or 0. *Anthers* short, bursting by slits.

Flowers 2-sexual. Petals 4–6. Stamens indefinite . . .	2. SCOLOPIA.
Flowers 2-sexual. Petals 5–6. Stamens 5–6	3. ERYTHROSPERMUM.
Flowers usually diœcious. Petals 0. Ovary 2–8-celled . .	4. FLACOURTIA.
Flowers diœcious. Petals 0. Ovary 1-celled. Seeds glabrous	5. XYLOSMA.
Flowers diœcious. Petals 0. Ovary 1-celled. Seeds hairy	6. ABERIA.

TRIBE III. **Pangieæ.** *Flowers* diœcious. *Petals* with an adnate scale or basal appendage.

Sepals connate. Stamens very many	7. GYNOCARDIA.
Sepals connate. Stamens 5	8. TRICHADENIA.
Sepals free. Stamens 5–8	9. HYDNOCARPUS.

1. COCHLOSPERMUM, Kunth.

Trees or shrubs, juice yellow or red. *Leaves* digitately lobed or divided. *Flowers* large, yellow, 2-sexual. *Sepals* 5, deciduous. *Petals* 5, large, contorted in bud. *Stamens* many, on an eglandular disk; anther-cells with pores or short slits. *Ovary* globose, almost 3–5-celled; style simple, stigma toothed; ovules very many, on 3–5 parietal placentas. *Capsule* 3–5-valved, endocarp membranous. *Seeds* cochleate; testa hard, woolly; embryo curved.—DISTRIB. About 11 species, all tropical.

1. **C. Gossypium,** *DC. Prodr.* i. 527; leaves palmately 3–5-lobed tomentose beneath, lobes acute entire. *Wall. Cat.* 1843; *Wight in Hook. Bot. Misc.* ii. 357, *Suppl.* t. 18; *W. & A. Prodr.* 87; *Planch. in Hook. Kew Journ. Bot.* vi. 306. Bombax gossypium. *Linn.*; *Roxb. Fl. Ind.* iii. 169.

Dry hills GARWHAL, BUNDELKUND, BEHAR, ORISSA and the DEKKAN; also commonly planted near temples.

A small naked tree; branchlets tomentose. *Leaves* 3–8 in. diam., old glabrous; petiole slender. *Flowers* 4–5 in. diam., in few-flowered terminal panicles, golden yellow. *Sepals* silky. *Petals* obovate, notched. *Capsule* 2–3 in., 5-lobed.

1* **BIXA,** Linn.

A tree. *Leaves* simple; stipules minute. *Flowers* in terminal panicles, 2-sexual. *Sepals* 5, imbricate, deciduous. *Petals* 5, contorted in bud. *Anthers* opening by 2 terminal pores. *Ovary* 1-celled; style slender, curved, stigma notched; ovules many, on 2 parietal placentas. *Capsule* loculicidally 2-valved, placentas on the valves. *Seeds* many, funicle thick, testa pulpy; albumen fleshy; embryo large, cotyledons flat.

B. ORELLANA, *L.*; *Roxb. Fl. Ind.* ii. 31; *W. & A. Prodr.* 31. (Anatto.)

Cultivated throughout INDIA, and the tropics generally, for the red dye afforded by the testa.—Native of America.

A small evergreen tree. *Leaves* 4–8 by $2\frac{1}{2}$–5 in., cordate, acuminate, glabrous; petiole slender, 2–3 in. *Flowers* 2 in. diam., purple or white. *Capsule* $1\frac{1}{2}$ in., ovoid or subglobose, base intruded, softly prickly.

2. **SCOLOPIA,** Schreber.

Trees, spinous in India, spines often compound. *Leaves* alternate, entire; stipules minute or 0. *Flowers* small, racemed, axillary, 2-sexual. *Sepals* 4–6, slightly imbricate in bud. *Petals* 4–6, subsimilar, imbricate in bud. *Stamens* many; anthers ovoid, opening by slits, connective produced. *Ovary* 1-celled; style erect, stigma entire or lobed; ovules few, on 3–4 parietal placentas. *Berry* 2–4-seeded. *Seeds* with long funicles, testa hard; cotyledons foliaceous.—DISTRIB. Species about 15; Australian, Asiatic and African.

1. **S. rhinanthera,** *Clos. in Ann. Sc. Nat. Sér.* 4, viii. 252; leaves lanceolate or oblong-lanceolate crenulate 5-plinerved, petiole 2-glandular at the top, racemes pubescent, sepals and petals 4 each, fruit pisiform 2–6-seeded. *Miquel Fl. Ned. Ind.* i. pt. 2, 107. Phoberos rhinanthera, *Benn. Pl. Jav. Rar.* 187, t. 39. P. macrophylla, *W. & A. Prodr.* 30. Flacourtia inermis, *Wall. Cat.* 6673 *G, H*, only.

MALACCA, *Griffith.*—DISTRIB. Java, Borneo.

A tree. *Leaves* 3–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., coriaceous, shining, base rounded or acute, teeth glandular; petiole $\frac{1}{2}$ in. *Racemes* 3–4 in.; flowers 1- or more-bracteate. *Sepals* downy. *Petals* twice as long, glabrous, ciliate. *Connective* of anthers glabrous. *Ovary* globose.

2. **S. Roxburghii,** *Clos. l.c.* 250; leaves oblong-lanceolate acuminate subcrenate glabrous 3–5-plinerved at the base, petiole 2-glandular at the top or not, racemes softly pubescent, sepals and petals 6 each, fruit olive-formed. *Miq. Fl. Ned. Ind.* i. pt. 2, 107. Phoberos Roxburghii, *Benn. Pl. Jav. Rar.* 192. Ludia spinosa, *Roxb. Fl. Ind.* ii. 507. Flacourtia stigmarota, *Wall. Cat.* 6678, *in part.*

Mergui, *Griffith.*—Distrib. Sumatra.

Spines on trunk compound. *Leaves* 4–5 by $1\frac{1}{2}$–$2\frac{1}{4}$ in., coriaceous, shining above; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Racemes* axillary, 1 in.; flowers yellow, solitary, bracts deciduous. *Disk* pubescent. *Connective* ciliate.

3. **S. crenata,** *Clos. l.c.* 250; leaves ovate or oblong-lanceolate obtusely or acutely acuminate subcrenate glabrous obscurely 3–5-plinerved, petiole $\frac{1}{4}$–$\frac{1}{2}$ in., racemes axillary glabrous or puberulous, sepals and petals 5–6 each, fruit globose green (dry size of a cherry). S. pseudo-crenata, acuminata, chinensis, lanceolata, *and* crassipes, *Clos. l. c.* S. sæva, *Hance in Ann. Sc. Nat. Sér.* 4, xviii. 182. Phoberos crenatus, *W. & A. Prodr.* 29; *Dalz. & Gibs. Bomb. Fl.* 11. P. lanceolatus *and* P. Wightianus, *W. & A. Prodr.* 30. P. acuminatus, Hookerianus, *and* Arnottianus, *Thwaites Enum.* 17 and 400. Flacourtia sapida *and* crenata, *Wall. Cat.* 6675 *H*, 6679.

Malabar, Canara, Maisor, and Ceylon, in hilly districts.—Distrib. China and Philippines.

Branches of young trees armed, of old unarmed. *Leaves* 2–6 by 1–2 in., base acute, teeth glandular, shining above, pale and reticulate beneath; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* 1–3 in., terminal flowers at times corymbose; bracts deciduous; pedicels 1–3-flowered. *Connective* of anthers glabrous.—Excessively variable. *S. dasyanthera*, Bennett, united with this by Clos, is a different species.

4. **S. Gærtneri,** *Thwaites Enum.* 400; leaves oblong to orbicular obtuse or acute glabrous, petiole very short, racemes simple, sepals and petals 5 each, fruit pisiform red fleshy. S. pusilla, *Moon. Cat.; Clos. l.c.* 251. Limonia pusilla, *Gærtn. Fruct.* i. 279, t. 58, f. 4.

Ceylon, from the sea coast to 1500 ft.

A tree, spines compound on the trunk, simple or 0 on the branches. *Leaves* 1–3 by $\frac{1}{2}$–2 in., coriaceous, base rounded cordate or subacute, thin, reticulate on both surfaces; petiole $\frac{1}{12}$–$\frac{1}{6}$ in.

3. **ERYTHROSPERMUM,** Lamarck.

Trees or shrubs. *Leaves* alternate, quite entire. *Flowers* racemed fascicled or panicled, 2-sexual. *Sepals* 4–6, imbricate in bud. *Petals* 4–6, usually small. *Stamens* 4–6; anthers lanceolate-sagittate, connective dilated. *Ovary* 1-celled; style short, stigma entire or 3–4-fid; ovules many, on 3–4 parietal placentas. *Capsule* coriaceous, 3–4-valved; valves bearing the seeds on the middle. *Seeds* few, testa coriaceous or fleshy; embryo incurved.—Distrib. Species 6, all Mascarene but the following.

1. **E. phytolaccoides,** *Gard. in Calc. Journ. Nat. Hist.* vii. 9; glabrous, leaves elliptic-lanceolate acuminate entire or subserrate, flowers 5-merous. *Thwaites Enum.* 18.

Ceylon, in the Ambamagowa and Ratnapoora districts.

A tree, 30–40 ft. *Leaves* $3\frac{1}{2}$–8 by $1\frac{1}{2}$–3 in., shining above, base acute; petiole $\frac{1}{4}$–$\frac{2}{3}$ in. *Racemes* axillary and terminal, simple or panicled, many-flowered. *Flowers* $\frac{1}{2}$ in. diam., white. *Sepals* ovate, obtuse, equalling the ovate-oblong ciliate petals. *Anthers* large, on very short filaments. *Capsule* globose, 3–4-valved, $\frac{1}{2}$ in. diam., 1–2-seeded. *Seeds* globose; testa red.

4. **FLACOURTIA,** *Commers.*

Trees or shrubs, often spinous. *Leaves* toothed or crenate. *Flowers* small, diœcious, rarely 2-sexual. *Sepals* 4–5, small, imbricate. *Petals* 0. *Stamens* many; anthers versatile. *Ovary* on a glandular disk; styles 2 or more, stigmas notched or 2-lobed; ovules usually in pairs on each placenta. *Fruit* indehiscent, endocarp hard, with as many cells as seeds. *Seeds* obovoid, testa coriaceous; cotyledons orbicular.—DISTRIB. About 12 species, natives of the Old World, some are cultivated in various tropical countries.

After a long study of extensive suites of specimens, we find ourselves quite unable to distinguish the forms of several species of this genus, and especially of 5, 6, 7, and 8, which are all excessively variable.

* *Leaves usually more or less lanceolate and acuminate.*

1. **F. sumatrana,** *Planch. mss. in Herb. Hook.*; unarmed, leaves oblong acuminate base cordate glabrous obtusely gland-serrate, nerves beneath pubescent, lowest close-set, flowers racemed diœcious, stigmas 2-lobed. *Wall. Cat.* 6678 *A*, *in part.* ? Ludia fœtida, *Roxb.*

TENASSERIM, *Helfer.*—DISTRIB. Sumatra.

Young branches only puberulous. *Leaves* 5–10 by 2½–4½ in., thin, coriaceous, shining above; petiole ¼–½ in., and midrib below pubescent. *Racemes* axillary, fascicled, short. *Disk* cupular. *Ovary* 4–7-celled; styles 4–7. *Fruit* small, oblong.

2. **F. inermis,** *Roxb. Cor. Pl.* iii. 16, t. 222; *Fl. Ind.* iii. 833; unarmed, leaves ovate or oblong-lanceolate acute or acuminate obtusely serrate glabrous, flowers 2-sexual in fascicled pubescent racemes, stigmas 2-lobed. *Jack. Mal. Misc., and in Hook. Bot. Misc.* i. 289; *Wall. Cat.* 6673, *excl.* G, H, I; *W. & A. Prodr.* 29. ? F. quintuplinervis, *Turcz. in Bull. Mosc.* xxxvi. 353.

SILHET, SINCAPORE, PENANG, *Jack*, &c., cultivated in India.—DISTRIB. Sumatra.

Young branches puberulous. *Leaves* 4–8 by 2–3½ in., base acute or rounded, shining, thin, coriaceous, midrib below pubescent; petiole ⅓–½ in. *Disk* covered with fleshy orange glands. *Ovary* 5-celled, cells 2-ovuled; stigmas 4–8, 2-lobed. *Fruit* size of a cherry, red, acid, pyrenes 8–10.

3. **F. montana,** *Grah. Cat. Bomb. Pl.* 10; branches spinous, flowering unarmed, softly pubescent, leaves oblong or oblong-lanceolate obtusely acuminate crenate glabrous above hairy beneath, base 3–5-plinerved, flowers diœcious in fascicled densely pubescent racemes. *Dalz. & Gibs. Bomb. Fl.* 10. F. inermis, *Miq. Pl. Hohen. not Roxburgh.*

CANARA and CONCAN, *Dalzell*, &c.

A very thorny tree. *Leaves* 5–7 by 2–3½ in., coriaceous, base rounded or acute, shining above, glabrate beneath when old; petiole ⅓ in., and costa beneath tomentose. *Disk* of ♂ glandular. *Fruit* slightly acid, size of a cherry.—There is another *F. montana*, of Zippel (Linnæa xv. 176) from Timor.

4. **F. mollis,** *H. f. & T.*; flowering branches softly pubescent, leaves oblong or oblong-lanceolate acute or acuminate crenate-toothed glabrous except the midrib above downy beneath, flowers diœcious ♂ in racemes almost umbellate.

TENASSERIM, *Griffith*, *Helfer.*

A tree; bark smooth, grey. *Leaves* 4–6 by 1½–2 in., base rounded or acute, penninerved; petiole ¼ in. Fl. ♀ and fruit unknown.

5. **F. Rukam,** *Zoll. & Moritz. Verz.* 33; unarmed, young branches pubescent, leaves oblong or oblong-lanceolate quite glabrous acute or acuminate coarsely glandular-crenate, flowers diœcious umbelled, stigmas 6–8 capitate emarginate. *Clos in Ann. Sc. Nat. Sér.* 4. viii. 216; *Miq. Fl. Ned. Ind.* i. pt. 2, 104. F. cataphracta, *Blume Bijd.* 55 (*not of Roxb.*).

MALACCA or MERGUI, *Griffith.*—DISTRIB. Philippine Islands. Much cultivated for its fruit.

A tree. *Leaves* 3–5 by 1¼–2 in, firm, coriaceous, base acute or rounded, penninerved; petiole ¼ in. *Ombels* fascicled, 4-flowered, subsessile, pubescent. *Styles* erect, remote. *Fruit* size of a large cherry.

6. **F. Cataphracta,** *Roxb. in Willd. Sp. Pl.* iv. 830; *Cor. Pl.* iii. t. 222; *Fl. Ind.* iii. 834: branches white-dotted glabrous young armed, leaves oblong or oblong-lanceolate long acuminate quite glabrous crenate-serrate, flowers diœcious in irregular glabrous racemes, stigmas 4–6 capitate. *Wall. Cat.* 6674 (*excl. C*); *Clos l.c.* (*not of Roth., Blume* or *Dalzell ?*). F. Jangomas, *Miq.* Stigmarosa Jangomas, *Lour.* Roumea Jangomas, *Spreng.* Spina spinarum, *Rumph. Amb. Cap.* 43, p. 38, xix. t. 1, 2.

From Lower Bengal and Assam to Chittagong, Malacca, and Singapore.—Distrib. Malay Islands, China.—Commonly cultivated.

A small tree; spines compound. *Leaves* 2–4 by 1–1¾ in., membranous, lower on the branches often obtuse; petiole ¼–½ in. *Ovary* flask-shaped, neck contracted. *Flowers* very small, ⅒–⅛ in. diam. *Fruit* the size of a small plum, purple, very acid.—Clos errs in considering this a native of Africa; Bojer (Hort. Maur.) attributes it to India, and Roxburgh gives it a well-known Bengali name (Paniala). The description in the Bombay Flora is too brief for identification.

** *Leaves usually oblong obovate or orbicular, obtuse or obtusely pointed, rarely elliptic-lanceolate.*

7. **F. Ramontchi,** *L'Herit. Stirp.* 59, t. 30, 31; armed, branchlets glabrous or pubescent, leaves very variable elliptic-oblong obovate or suborbicular, obtusely serrate or crenate, flowers diœcious in short branched glabrous racemes, stigmas 5–11 free or connate. *W. & A. Prodr.* 29; *Dalz. & Gibs. Bomb. Fl.* 10.

Common throughout India, wild or cultivated.—Distrib. Madagascar, the Eastern Archipelago.

We are quite unable to define the various forms brought together under the names of *F. Ramontchi* and *sapida*, and which include either several species, or one that spreads all over India, and varies much, presenting however the following principal varieties or species.

Var. 1. *Ramontchi proper;* leaves glabrous 2–3 in. membranous elliptic ovate or oblong coarsely crenate, racemes very slender glabrous or nearly so. F. Ramontchi, *Wall. Cat.* 6677; *Wight Cat.* 108; *Ic.* t. 85; *Oliv. Fl. Trop. Afr.* i. 120.—Common in the Peninsula.

Var. 2. *sapida;* leaves 1–2 in. membranous or coriaceous glabrous or pubescent on the costa beneath and petiole elliptic broadly oblong cuneate-obovate or suborbicular, peduncles stouter pubescent.—F. sapida, *Roxb. Cor. Pl.* 1. t. 69; *Fl. Ind.* iii. 835; *W. & A. Prodr.* 29; *Wall. Cat.* 6675 C.—Common in the Western Ghauts and elsewhere in the Peninsula.

Var. 3. *latifolia;* branches robust glabrous, leaves large 3–5 in. glabrous coriaceous broadly elliptic-oblong or orbicular, costa below and petiole puberulous, nerves strong very oblique, racemes very short pubescent, stigmas sessile.—Carnatic, Nilgherries.

Var. 4. *occidentalis;* branchlets petioles leaves often beneath and sometimes above and racemes tomentose or velvety, leaves 1–2 in. broadly oblong orbicular or obovate rarely elliptic or ovate, base rounded cuneate or cordate.—Probably a distinct species. *Wall. Cat.* 6675, excl. B, C, H, & K. ? F. Perottetiana, *Clos in Ann. Sc. Nat. Sér.* 4, viii. 218.—From Behar and the Dekkan, northward and westward to Oude, Rohilkund, and the Punjab; abundant—(Beluchistan).

Var 5. *racemulifera;* leaves small 1¼–1½ in. membranous glabrous elliptic-oblong crenulate-serrate puberulous, petiole short, flowers very small diœcious in short glabrous erect strict many-flowered racemes ½–1 in. long very shortly pedicelled, bracteoles broad. —*Herb. Madras, Wall. Cat.* 6675 K, male flower only; *Wight Cat.* 107. ? F. sepiaria β frondosa, *Clos in Ann. Sc. Nat. Sér.* 4. viii. 217.—A very curious form, or probably different species. Wallich's specimens and four in Wight's Herb. are all we have seen, and these are male.

8. **F. sepiaria,** *Roxb. Cor. Pl.* i. 48, t. 68; *Fl. Ind.* iii. 835; shrubby, very thorny, thorns usually bearing flowers and fruit, leaves small obcordate obovate or oblong or cuneate-obovate or orbicular crenate-serrate, when old rigid coriaceous and shining, flowers diœcious solitary or few in nearly glabrous racemes, stigmas 3–4. *W. & A. Prodr.* 29; *Wall. Cat.* 6676; *Dalz. & Gibs. Bomb. Fl.* 11. F. obcordata, *Roxb. Fl. Ind.* iii. 835. H. cordifolia *and* rotundifolia, *Roxb. Hort. Beng.* 73. Sideroxylon spinosum, *Willd. Sp. Pl.* i. 1091; *Rheede Hort. Mal.* v. t. 39.

Dry jungles throughout Bengal, the Western Peninsula, and Ceylon.—Distrib. Java.

A very rigid thorny bush. *Leaves* $\frac{1}{2}$–3 in., usually more or less cuneate at the base; when larger and more membranous or more elliptic it is difficult to distinguish this from *F. Ramontchi* vars. 1 and 2. *Flower* generally solitary or twin in a very imperfect raceme, very small. *Male sepals* ovate, obtuse; *female* orbicular. *Stigmas* usually separate, on very short styles. *Drupe* size of a large pea.

Flacourtia Wightiana, *Wall. Cat.* 6672 is a *Scepa.* F. nivea, *Moon. Cat.* 70 is *Fluegga leucopyrus,* Wt.

5. XYLOSMA, Forster.

Characters of *Flacourtia*, but ovary with 2, rarely 3–6 few-ovuled parietal placentas, a usually entire very short style, capitate stigma (in the Indian species) and globose 2–8-seeded berry.—Distrib. Species about 25, natives of all tropical regions.

1. **X. longifolium,** *Clos in Ann. Sc. Nat. Sér.* 4, viii. 231; leaves linear- or elliptic- or oblong-lanceolate acuminate obtusely serrate, nerves spreading, ♂ flowers in short racemes, rarely in long panicles, bracts ovate acuminate. Flacourtia ferox, *Wall. mss. in Voigt. Hort. Suburb. Calc.* 84.

Western Himalaya on the outer ranges, ascending on 5000 ft., from Kumaon, *Strach. and Wint.*, to Marri, *Stewart.* Assam, at Nowgong and Gowahatty, *Jenkins,* &c.

A glabrous bush; branches rather long, slender. *Leaves* 4–9 by $1\frac{1}{2}$–$2\frac{1}{4}$ in., coriaceous, shining above, base acute, rarely obtuse; nerves 8–12 on each side the midrib; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Racemes* usually very short, $\frac{1}{3}$ in., and crowded in the leaf axils, sessile, many-flowered, glabrous or puberulous, rarely elongate and branched. *Flowers* solitary or fascicled, $\frac{1}{8}$ in. diam. *Berry* glabrous, $\frac{1}{6}$ in. diam.—The specimens with panicled inflorescence occur amongst those from Assam.

2. **X. controversum,** *Clos l.c.;* leaves elliptic or elliptic-oblong (rarely lanceolate) acuminate obtusely serrate, nerves very oblique, flowers panicled puberulous, bracts linear-oblong. Flacourtia Cataphracta, *Wall. Cat.* 6674 C.

Nipal, *Wallich.* Khasia hills, *Griffith;* Churra, alt. 3–4000 ft., *H. f. & T.*

Very near *X. longifolium,* especially the form of that species with panicled male flowers; best distinguished by the usually shorter (3–6 in.) leaves, often more membranous, with invariably very oblique nerves and fewer of them on each side (6–8). The sepals are equal or unequal, and the character of the bracts is perhaps not a very good one. The fruit is alike in both.

3. **X. latifolium,** *H. f. & T.;* leaves broadly elliptic-oblong obtuse or acute obtusely serrate or subentire, nerves few very oblique, petiole

pubescent, ♂ flowers in small branched slender pubescent few-flowered panicles, sepals minute orbicular ciliate.

Bababooden hills in Maisor, *Law*, *Stocks*.

A large thorny tree, twigs petioles and inflorescence finely downy. *Leaves* 2–5 by 1–2½ in., hardly coriaceous, base acute, nerves 4 or 5 on each side, the 2 lower running nearly throughout the blade; petiole ⅓–½ in. ♂ *Panicles* ½–1 in., very slender, sparingly branched; bracts linear-oblong. *Fruit* very small, about ⅙ in. diam. with 4 placentas; style very distinct, stigma capitate 4-lobed.

6. **ABERIA**, Hochst.

Trees or shrubs, often spinous. *Leaves* entire or toothed, exstipulate. *Flowers* axillary, diœcious; ♂ subracemose, fascicled, or umbellate, ♀ solitary or fascicled. *Sepals* 5–8, tomentose, subvalvate. *Petals* 0. *Disk* of ♀ glandular. *Stamens* numerous; anthers short. *Ovary* 1-celled; styles 2–5, short, spreading, stigma notched or truncate; ovules 2–6 on each of 2–7 parietal placentas. *Berry* globose, tomentose. *Seeds* pubescent or tomentose, compressed, imbedded in pulp; cotyledons flat, broad.—Species 5, all but the following African.

1. **A. Gardneri,** *Clos in Ann. Sc. Nat. Sér.* 4, viii. 236; leaves ovate elliptic or elliptic-lanceolate acuminate entire or toothed pubescent above tomentose beneath. Roumea hebecarpa, *Gard. in Calc. Journ. Nat. Hist.* vii. 9; *Thwaites Enum.* 18.

Ceylon, at Condasalle, Maturatte, &c., *Gardner*, &c.

A tree, 16–20 ft.; branches pale, twigs reddish, tomentose. *Leaves* 2–5 by ½–2 in.; midrib and very oblique veins red, base acute or rounded; petiole ¼–⅓ in. *Flowers* ⅓ in. diam.; ♂ umbelled on very short peduncles; ♀ solitary or few together. *Filaments* equalling the lanceolate, acute sepals. *Styles* hairy; stigmas fimbriate. *Fruit* 1 in. diam.—The name of *hebecarpa* was not adopted by Clos, because all the species of Aberia have pubescent fruit.

7. **GYNOCARDIA**, R. Br.

A perfectly glabrous tree. *Leaves* quite entire. *Flowers* axillary or truncal, fascicled, diœcious. *Calyx* cup-shaped, 5-toothed or bursting irregularly. *Petals* 5, with a ciliate scale opposite each. Fl. ♂: *Stamens* many; anthers basifixed, linear. *Ovary* 0. Fl. ♀: *Staminodes* 10–15, villous. *Ovary* globose, 1-celled; styles 5, stigmas large cordate; ovules many, on 5 parietal placentas. *Berry* subglobose, rind thick, hard, rough. *Seeds* obovoid, immersed in pulp, testa thick; albumen oily; cotyledons flat, subreniform, radicle ovoid.

1. **G. odorata,** *R. Br. in Roxb. Cor. Pl.* 95, t. 299; quite glabrous, leaves oblong or linear oblong abruptly acuminate shining above. *Bennett Pl. Jav. Rar.* 207. Chaulmoogra odorata, *Roxb. Fl. Ind.* iii. 835. Chilmoria dodecandra, *Hamilt. in Trans. Linn. Soc.* xiii. 500.

From Sikkim and the Khasia hills eastwards to Chittagong, Rangoon, and Tenasserim.

Branches slender, flexuous. *Leaves* bifarious, largest 6–10 by 3–4 in., smallest 4–6 by 1¼–2 in., coriaceous, strongly reticulate beneath; petiole ¼–1 in. *Flowers* sweet scented, yellowish, in very large fascicles on the trunk, solitary or few together in the leaf axils, very variable in size, ⅓–2 in. diam., the females largest; peduncles 1–3 in.; bracts basal, minute. *Calyx* coriaceous. *Filaments* woolly. *Fruit* 3–5 in. diam. *Seeds* 1 in. long.

8. **TRICHADENIA,** Thwaites.

A tall tree. *Leaves* long-petioled, alternate, coriaceous. *Stipules* foliaceous, deciduous. *Flowers* in short axillary racemes or panicles. *Calyx* very coriaceous. *Petals* 5, imbricate, with an adnate scale on each. Fl. ♂: *Stamens* 5; anthers linear. Fl. ♀: *Staminodes* 0. *Ovary* 1-celled; styles 3, very short, stigmas subcapitate; ovules solitary on 3 parietal placentas. *Berry* spherical, 1–3-seeded. *Seeds* large, testa bony, albumen oily; cotyledons foliaceous, rugose.

1. **T. zeylanica,** *Thwaites in Hook. Kew. Journ. Bot.* vii. 196, t. 7; *Enum.* 19; leaves oblong acuminate sinuate-toothed finely pubescent on the nerves beneath, racemes tomentose.

Ceylon; central province, alt. 3000 ft., *Thwaites.*

A very large tree; branchlets very stout, *inflorescence* and petioles tomentose. *Leaves* 5–12 by 2–4 in., base rounded; petiole 2–3 in.; nerves beneath very strong. *Racemes* 3–5 in. *Flowers* $\frac{1}{2}$ in. diam., pale green. *Fruit* $1\frac{1}{2}$–3 in. diam. *Seed* $\frac{1}{2}$–$\frac{3}{4}$ in. diam.

9. **HYDNOCARPUS,** Gærtner.

Trees. *Leaves* alternate, serrate or entire, transverse venules numerous; stipules deciduous. *Flowers* solitary or in irregular axillary few-flowered racemes or fascicles, diœcious. *Sepals* 5, equal or unequal, imbricate in bud. *Petals* 5, with a scale opposite each. Fl. ♂: *Stamens* 5–8; anthers reniform, connective broad. *Ovary* 0 or rudimentary. Fl. ♀: *Stamens* as in the ♂ but without pollen, or reduced to staminodes. *Ovary* 1-celled; stigmas 3–6, sessile or subsessile, spreading, dilated, lobed; ovules many, on 3–6 parietal placentas. *Berry* globose, rind hard, many-seeded. *Seeds* many, imbedded in pulp, testa crustaceous, striate, albumen oily; cotyledons very broad, flat. Distrib. Species about 6, tropical Asiatic.

1. **H. venenata,** *Gærtn. Fruct.* i. 288, t. 60, f. 3; leaves lanceolate or oblong- or elliptic-lanceolate, flowers $\frac{1}{2}$ in. diam. racemed pentandrous, sepals subequal orbicular, scales villous much smaller than the orbicular petals, fruit the size of a walnut. *Blume Mus. Bot.* i. 15. H. inebrians, *Vahl Symb.* iii. 100; *DC. Prodr.* i. 257; *Thwaites Enum.* 18.

Ceylon, by banks of rivers, ascending to 2000 ft.

A large tree; branchlets puberulous or silky. *Leaves* 5–7 by 1–$2\frac{1}{2}$ in., obscurely serrate, coriaceous; nerves very oblique; petiole $\frac{1}{2}$ in., stout. *Racemes* 1 in. or less, densely tomentose; buds $\frac{1}{6}$ in. diam. *Sepals* rather shorter than the petals, ciliate, tomentose on the back. *Stamens* equalling the glabrous petals. *Fruit* densely tomentose. *Seeds* grooved, ridges rough.

2. **H. Wightiana,** *Blume Rumph.* iv. 22; leaves elliptic- or oblong-lanceolate long acuminate entire or serrate, flowers 1 in. diam. racemed pentandrous, 3 inner sepals larger, petals ciliate twice as long as the ovate fimbriate scales, ♀ flowers with imperfect stamens, fruit the size of a small apple. *Blume Mus. Bot.* i. 15; *Dalz. & Gibs. Fl. Bomb.* 11. H. inebrians, *Wall. Cat.* 6670; *Wight Ill.* i. t. 16; *Bennett Pl. Jav. Rar.* 207. Munnicksia, *Dennstd. Clav. Hort. Mal.*—? *Rheede Hort. Malab.* i. 65, t. 36 (*fruit represented as rough with large tubercles*).

Western Peninsula, from the S. Concan along the coast ranges.

A tall tree; twigs usually brown pubescent (rarely glabrate) as are the racemes. *Leaves* 4–9 by $1\frac{1}{2}$–4 in., coriaceous or membranous, sometimes deeply obtusely serrate or toothed, base round acute or subcordate; petiole ¼–½ in. *Flowers* solitary or racemed, white. *Sepals* green, pubescent. *Stamens* villous at the base, equalling the petals. *Ovary* densely pubescent. *Fruit* 2–4 in. diam., tomentose. *Seeds* obtusely angular.

3. **H. alpina,** *Wight Ic.* t. 942; leaves elliptic oblong or more or less lanceolate obtusely acuminate or subacute quite entire, flowers 1 in. diam. racemed pentandrous, sepals equal, petals oblong-lanceolate glabrous equalling the linear scales, ♀ flowers with linear oblong obtuse staminodes.

Moist valleys of the Nilghiri Mts., *Wight;* Ceylon, *Thwaites.*

A tree 70–100 ft.; twigs glabrous or nearly so. *Leaves* very variable, young red, old deep green, 4–7 by 1½–2½ in., glabrous; petiole ⅓ in. *Flowers* racemed on very thick branched jointed peduncles and long pedicelled (in the Ceylon specimens), pedicels 1-1½ in. *Stamens* shorter than the petals. *Stigma* 5-lobed. *Fruit* globose, size of an apple, brown tomentose. *Seeds* imbedded in white pulp, testa hard.—Description chiefly from Wight.

4. **H. octandra,** *Thwaites in Hook. Kew Journ. Bot.* vii. 197; *Enum.* 19; leaves elliptic or elliptic- or ovate- or oblong-lanceolate obtusely acuminate quite entire, flowers ½ in. diam. fascicled octandrous, sepals unequal, petals twice as long as the rounded silky scales, ♀ fl. with imperfect stamens, fruit 2–3 in. diam.

Ambamagowa district, Ceylon, alt. 2500 ft., *Thwaites.*

A tree 40–50 ft.; branchlets tomentose. *Leaves* 3–4½ by 1¼–1¾ in., glabrous above, puberulous beneath with stellate hairs and glandular dots; petiole ¼–¾ in. *Flowers* 2–8 in a fascicle; pedicels ¼–½ in. *Sepals* oblong, obtuse. *Petals* orbicular, concave, ciliate. *Stamens* exceeding the petals. *Ovary* oblong; placentas 4, each 6-ovuled; stigmas 4. *Berry* woody, subtomentose, few or many-seeded.

5. **H. castanea,** *H. f. & T.;* perfectly glabrous, leaves linear-oblong acuminate red-brown when dry quite entire much reticulated, petiole ¾–1 in., ♀ flowers ¾ in. diam., sepals equal, scales lingulate silky equalling the linear-oblong petals, ovary ovoid beaked, fruit as large as an orange.

King's Island, Andamans, by the sides of torrents, *Helfer;* Malacca, *Griffith.*

A middle-sized tree. *Branches* stout, angular, smooth, black when dry. *Leaves* 8–14 by 2–3½ in., sides at base very unequal, one acute, the other rounded, thickly coriaceous, shining, strongly veined on both surfaces, nerves 6–10 on each side; petiole ¾–1 in., much thickened at the top, quite glabrous. *Flowers* ♀ (only seen) apparently solitary, axillary, sweet-scented; peduncles ¾ in., and orbicular concave sepals densely rusty-pubescent. *Petals* longer than the sepals, concave, obtuse, quite glabrous; scales subacute, rigid, narrower than the petals. *Staminodes* 5, erect, glabrous, oblong, lanceolate, obtuse, much shorter than the scales. *Ovary* villous, contracted into a conical beak; stigma sessile. "*Fruit* size of an orange, globose, rugose, brown, angled at the top, flesh granular hard, placentas several. *Seeds* large angular, testa double, outer subcoriaceous cellular, inner as thick." *Griff. mss.*

There is a Burmese species apparently of this genus collected by Griffith, but in too immature a state for description.

ORDER XV. PITTOSPOREÆ. (By Hook. f. & Thoms.)

Erect or climbing trees or shrubs. *Leaves* alternate or subverticillate quite entire (very rarely toothed); exstipulate. *Flowers* usually hermaphrodite, terminal or axillary. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate. *Torus* small. *Stamens* 5, opposite the sepals; anthers versatile, *Ovary* 1-celled, with 2–5 parietal placentas, or 2–5-celled by the projection of the placentas; style simple, stigma terminal 2–5-lobed; ovules many, parietal or axile, anatropous. *Fruit* capsular or indehiscent. *Seeds* usually many, albumen copious; embryo small, radicle next the hilum.—DISTRIB. Genera 9; species about 90, chiefly Australian.

1. PITTOSPORUM, Banks.

Erect trees or shrubs. *Sepals* free or connate below. *Petals* erect, claws connivent or connate. *Stamens* 5, erect; anthers 2-celled, introrse, bursting by slits. *Ovary* sessile or shortly stalked, incompletely 2–3-celled; ovules 2 or more on each placenta. *Capsule* 1-celled, woody, 2- rarely 3-valved; valves placentiferous in the middle. *Seeds* smooth, imbedded in pulp. —DISTRIB. Species about 50, subtropical Asiatic, Australian and Oceanic.

* Capsule 3-valved, twice as long as broad.

1. **P. glabratum,** *Lindl. in Journ. Hort. Soc.* i. 230; leaves obovate oblong or lanceolate, flowers in lax terminal corymbs, peduncles glandular-pubescent.—*Benth. Fl. Hongkong*, 19.

KHASIA HILLS, in thickets above 4000 ft., *Griffith*, &c.—DISTRIB. Amoy and Hongkong.

A straggling shrub, branches whorled. *Leaves* 2–4 by $\frac{2}{3}$–$1\frac{1}{4}$ in., glabrous, usually acuminate, base acute, white beneath. *Flowers* $\frac{2}{3}$ in., pale yellow. *Sepals* sometimes connate below, ovate, pubescent. *Ovary* linear-oblong, pubescent, style as long. *Capsule* 1 in. or more, obovoid-oblong, many-seeded.—In Griffith's Herb. there are specimens marked as from Sikkim, but probably through misplacement of tickets. Chinese specimens are usually quite glabrous, but the peduncles are now and then downy.

** Capsule 2-valved, when ripe broader than long.

† *Leaves and branches glabrous* (*except* 3, tetraspermum).

2. **P. humile,** *H. f. & T.*; dwarf, leaves lanceolate, racemes subumbellate few-flowered much shorter than the leaves, sepals obtuse, ovary glabrous.

KHASIA HILLS, banks of the Borpani river, alt. 5000 ft., *H. f. & T.*

A small, much branched shrub, 1–2 ft., glabrous. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ by $\frac{1}{3}$–$\frac{3}{5}$ in., short-petioled, obtuse or subacute, margins recurved. *Racemes* $\frac{1}{2}$–1 in., slightly pubescent; pedicels $\frac{1}{6}$–$\frac{1}{4}$ in., pubescent; bracts as long, linear. *Flowers* $\frac{1}{6}$ in., yellow-green. *Sepals* $\frac{1}{12}$ in., ovate, obtuse. *Petals* oblong. *Capsule* subglobose, scarcely compressed, 2-valved.

3. **P. tetraspermum,** *W. & A. Prodr.* 154; leaves broad-ovate to lanceolate acute, flowers in terminal many-flowered umbels, rays short simple or 2-fid, sepals ovate acute ciliate, ovary tomentose. *Wight Ic.* t. 971 (stigma bad).

NILGHIRI MTS.; and CEYLON, central province, alt. 5–7000 ft.

A large shrub or tree; branches often umbelled, young puberulous. *Leaves* $1\frac{1}{2}$–4 by $\frac{2}{3}$–2 in., glabrous, shining above, pale below, coriaceous, acute at both ends. *Umbels* sessile or shortly peduncled, rays many, $\frac{1}{2}$ in., short, bracteolate, glabrous or pubescent. *Flowers* $\frac{1}{2}$ in. long, yellow green. *Style* glabrous, 2 lobed. *Capsule* globose, glabrous, 2-valved, 4-seeded.—Very closely allied to *P. nilghirense*.

4. **P. nilghirense,** *W. & A. Prodr.* 154; leaves broad-ovate oblong or lanceolate, flowers in slender glabrous terminal 3–8-flowered corymbs, sepals ovate acute subciliate, ovary tomentose. *Wight Ill.* i. t. 70.

Nilghiri Mts., above 5000 ft.

A small tree. *Leaves* 1–4 by $\frac{1}{3}$–2 in., acute or obtuse, shining above, thinly coriaceous, base tapering. *Corymbs* several together; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., spreading; bracteoles minute, subulate. *Style* glabrous. *Capsule* subglobose, subcompressed, 2-valved, 6-seeded.—Very closely allied to states of the African *P. Senacia*, Putt.

5. **P. Ceylanicum,** *Wight Ill.* 173; leaves narrow-obovate, flowers in terminal peduncled or compound corymbs, sepals ovate acute subciliate, ovary pubescent. *Thwaites Enum.* 68 (*excl. most syn.*).

Ceylon; in the Oova district, alt. 3–5000 ft.

A small tree; branches leafy, glabrous. *Leaves* 3–4 by $\frac{3}{4}$–1$\frac{1}{4}$ in., obtuse or subacute, base tapering; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* several, 2–3 in., glabrous; bracteoles small, ovate, at the base of the pedicels. *Flowers* $\frac{1}{3}$ in., greenish-white. *Style* glabrous. *Capsule* subglobose, compressed, 2-valved.—An imperfectly known species which turns black in drying.

6. **P. floribundum,** *W. & A. Prodr.* 154; leaves lanceolate or oblong-lanceolate acute or acuminate, margins waved, flowers small pubescent in much-branched terminal compound corymbs, sepals ovate, ovary pubescent. *Royle Ill.* 77; *Wall. Cat.* 8127; *Dalz. & Gibs. Bomb. Fl.* 44. ? P. densiflorum. *Putterl. Monog.* 9. Senacia nepalensis, *DC. Prod.* i. 347. Celastrus verticillata, *Roxb. Fl. Ind.* 624, *Ed. Wall.* ii. 391.

Subtropical Himalaya, from Sikkim to Garwhal, ascending to 5000 ft. Khasia hills and Mishmi; Western Peninsula, Concan to the Nilghiri Mts.

A small tree; branches often umbelled. *Leaves* 2–8 by 1–3 in., glabrous, shining, pale below, coriaceous. *Corymbs* sometimes leafy below; branches 1–3 in., spreading, glabrous or pubescent. *Flowers* numerous, yellow *Sepals* obtuse or acute, subciliate. *Style* glabrous. *Capsules* pisiform, glabrous, about 6-seeded.—Nilghiri specimens are usually broader and shorter leaved than Himalayan. The African *P. Mannii*, H. f., is nearly allied, but has a glabrous ovary.

†† *Young branches pubescent or tomentose. Ovary tomentose in all.*

7. **P. dasycaulon,** *Miquel in Herb. Hohenack.* 775; leaves lanceolate or oblong-lanceolate glabrous or midrib beneath downy, flowers in dense much-branched terminal compound tomentose corymbs, sepals ovate acute.

Western Peninsula; hills of Canara (*pl. Hohenack.*); Belgaum, *Ritchie;* Concan, *Gibson.*

A shrub or small tree; branchlets densely tomentose. *Leaves* 2$\frac{1}{2}$–4 by 1–1$\frac{1}{2}$ in., pale green when dry, thin, coriaceous, margin subundulate; young petioles tomentose. *Flowers* white. *Sepals* ciliate. *Anthers* bright yellow. *Capsule* large, compressed, densely tomentose before dehiscence, about 6-seeded.—Flowers much larger than in *P. floribundum:* closely allied to *P. abyssinicum*, Hochst.

8. **P. eriocarpum,** *Royle Ill.* 77; leaves ovate obovate or broad lanceolate obtuse or acute, young floccose on both surfaces, flowers in many compound many-flowered often umbellate corymbs, sepals lanceolate densely tomentose. *Wall. Cat.* 8129, 8131, 9074.

Western Himalaya; in Garwhal and Kumaon, alt. 3–7000 ft.

A small tree; branches subverticillate, spreading; young tomentose. *Leaves* very variable, 3–8 by 1$\frac{1}{2}$–2$\frac{1}{2}$ in., adult pubescent beneath. *Peduncles* 1–2 in., bracteoles subulate. *Flowers* $\frac{1}{3}$ in. long, pale yellow. *Ovary* tomentose; style short, glabrous. *Capsules* rather large, tomentose, many-seeded, valves woody.

9. **P. ferrugineum,** *Ait.; DC. Prodr.* i. 346; leaves lanceolate or oblong-lanceolate acute or acuminate, young rusty pubescent, flowers very small in many terminal subsimple corymbose racemes, sepals narrow very

acuminate. *Wall. Cat.* 8128; *Benth. Fl. Austral.* i. 112. P. ferrugineum *and* Rumphii, *Putterl. Monog.* 7, 8.

EASTERN PENINSULA, from Moulmein to Sincapore, *Wallich*, &c.—DISTRIB. Eastern Archipelago, Australia.

A spreading much branched tree; young branches rusty-pubescent. *Leaves* 2½–4 by 1–2 in., thin, coriaceous, adult glabrous and shining above, glabrous or pubescent beneath. *Peduncles* 1 in., rusty-pubescent. *Flowers* ¼ in. long, greenish white. *Ovary* rusty-tomentose; style very short, glabrous. *Capsule* slightly compressed, rough, about 4-seeded.—Aiton's locality (Guinea) is no doubt an error.

ORDER XVI. **POLYGALEÆ.** (By Alfred W. Bennett, F.L.S.)

Annual or perennial herbs, erect or scandent shrubs, or timber trees. *Leaves* alternate (rarely whorled) or occasionally reduced to scales or 0, simple, quite entire. *Stipules* 0. *Flowers* irregular, 2-sexual, 3-bracteate. *Sepals* 5, unequal, 2 inner often petaloid (*wing-sepals*), deciduous or persistent, imbricate in bud. *Petals* 5 or 3, distinct, unequal, the inferior usually keel-shaped. *Stamens* 8 (in *Salomonia* 4–5, in *Trigoniastrum* 5) hypogynous, filaments united into a sheath, more rarely distinct; anthers opening by terminal pores, rarely by slits. *Ovary* free, 1–3-celled; style generally curved, stigma capitate; ovules 1 or more in each cell, anatropous. *Fruit* generally a 2-celled, 2-seeded, loculicidal capsule; or indehiscent and 1-seeded, or (in *Trigoniastrum*) of 3 indehiscent carpels. *Seed* usually strophiolate, albuminous, rarely exalbuminous.—DISTRIB. The whole world except New Zealand, chiefly in warm regions; genera 16; species 450–500.

Herbs or (more rarely) erect shrubs. Capsule loculicidal, 2-celled.
  Stamens 8, united; 2 interior sepals alæform . . . . . . 1. POLYGALA.
  Stamens 4–5, united; sepals petaloid, nearly equal . . . 2. SALOMONIA.
Climbing shrubs.
  Stamens 8, united; fruit 1-celled, indehiscent, samaroid . 3. SECURIDACA.
Trees or erect shrubs.
  Stamens 5, united; fruit of 3 samaroid carpels . . . . . . 4. TRIGONIASTRUM.
  Stamens 8, distinct; fruit 1-celled, not winged . . . . 5. XANTHOPHYLLUM.

1. **POLYGALA,** Linn.

Herbs or more rarely shrubs. *Leaves* alternate. *Sepals* usually persistent; 2 inner larger, usually petaloid. *Petals* 3, united at the base with the staminal sheath, the inferior keel-shaped and generally crested. *Stamens* 8, filaments united for their lower half into a split sheath; anthers opening by pores. *Ovary* 2-celled; ovules 1 in each cell, pendulous. *Capsule* 2-celled, loculicidal, 2-seeded. *Seeds* almost always strophiolate and albuminous.—DISTRIB. Conterminous with the order, except Tasmania. About 250 species.

SECT. I. **Chamæbuxus,** *Tourn.* (genus). Shrubs with large handsome flowers. *Calyx* deciduous. *Keel* crested. *Seeds* with a large strophiole, exalbuminous.

1. **P. arillata,** *Hamilt. in Don Prodr.* 199; shrubby, leaves lanceolate or oblong-lanceolate, flowers yellow in drooping racemes or panicles. *Wall. Pl. As. Rar.* t. 100; *Cat.* 4191; *Griff. Notul.* iv. 535, t. 507; *Ic. Pl. Ind. Or.* t. 597. Chamæbuxus arillata *and* paniculata, *Hassk. in Miq. Ann. Mus. Bot.* i. 153, 154.

Subtrop. and Temp. Himalaya, from Nipal eastward, alt. 2–6000 ft. Khasia Mts., alt. 4–5000 ft. Western Peninsula, Ava, Ceylon.—Distrib. Malayan Archipelago, S. China.

An erect pubescent or nearly glabrous shrub, 4–8 ft. *Leaves* 4–6 by ¾–2½ in., lanceolate obovate-lanceolate or elliptic-oblong, acuminate; petiole ⅓–½ in. *Flowers* ½ in. long, in usually panicled racemes; bracts linear, deciduous. *Sepals* very unequal, caducous, upper very concave, 2 lower small, ovate; wings very large, ovate, red-purple. *Corolla* yellow; keel amply crested, united to the lateral petals for half their length. *Capsule* ½–¾ in., broad-reniform, rather fleshy, rugose when dry. *Seeds* large, globose; cotyledons fleshy.

Sect. II. Herbs. *Flowers* small. *Calyx* deciduous after flowering. *Keel* not crested. *Seeds* albuminous.

2. **P. triphylla,** *Ham. in Don Prodr.* 200; annual, glabrous, leaves spathulate or elliptic long-petioled, racemes terminal many-flowered leafless.

Temp. Himalaya, alt. 4–8000 ft.; from Sirmore to Sikkim. Khasia Mts., *Griffith;* Central India, *Vicary;* Ava and Birma, *Wallich.*

Stem slender, 2–10 in., erect or ascending, weak. *Leaves* ½–2½ in., membranous, glabrous, obtuse or subacute, contracted into the petiole. *Racemes* 1½–2 in., slender. *Flowers* $\frac{1}{12}$ in., secund; bracts deciduous. *Outer sepal* small, ovate, acute; upper larger; wings petaloid, elliptic, equalling the corolla. *Keel* hooded, with 2 inflated terminal lobes; lateral petals narrow. *Capsule* ⅒–⅛ in., orbicular, entire, narrowly winged. *Seeds* black, slightly hairy; strophiole galeate, with 2 minute appendages.—Capsules in some (diseased?) Moulmein specimens, with unequal lobes, and irregular much-veined wings.

Var. 1. *triphylla proper;* leaves small orbicular or spathulate, flowers pink. *Royle Ill.* t. 19 D; P. hyalina, *Wall. Cat.* 4181; Semeiocardium Hamiltonii, *Hassk. in Miq. Ann. Mus. Bot.* i. 151.

Var. 2. *glaucescens,* Wall. Cat. 4182 (Sp.); leaves much larger 1–2 in. elliptic, flowers yellow. P. furcata, *Royle Ill.* t. 19, B. Semeiocardium hyalinum *and* glaucescens, *Hassk. l.c.*

Sect. III. Herbs, sometimes woody at the base. *Calyx* persistent. *Keel* crested. *Seeds* albuminous.

* Bracts persistent, at least till the flower expands.

† *Undershrubs. Racemes axillary. Wings petaloid, membranous. Strophiole 2-appendiculate.*

3. **P. javana,** *DC. Prodr.* i. 327; stems closely pubescent, leaves obovate or obovate-lanceolate mucronate, racemes many-flowered, bracts triangular-ovate, wings triangular. *W. & A. Prodr.* i. 38; *Thwaites Enum.* 22; *Hassk. in Miq. Ann. Mus. Bot.* i. 180. P. ceylanica, *Heyne in Wall. Cat.* 4183. ? P. tinctoria *Vahl; Hassk. l.c.* 181.

Western Peninsula and Ceylon.—Distrib. Java.

A much branched undershrub; branches stout, strict, erect or spreading, leafy. *Leaves* ¾–1½ in., usually obovate and apiculate, finely pubescent on both surfaces; petiole very short. *Racemes* ½–3–4 in., sessile, stiff, few- or many-flowered, densely pubescent. *Flowers* ⅓–½ in. long; pedicels pubescent; bracts small, ovate. *Outer sepals* subequal; wings broadly triangular-ovate, angles rounded, exceeding the orbicular notched pubescent shortly stipitate capsule. *Seeds* very hairy; strophiole galeate, appendages ovate, equalling the seed.

4. **P. crotalarioides,** *Ham. in Don Prodr.* 199; stems villous with spreading hairs, leaves elliptic or oblong-obovate apiculate hairy ciliate,

racemes very short, bracts subulate, wings obovate. *DC. Prodr.* i. 327. *Wall. Pl. As. Rar.* ii. 185; *Cat.* 4176, and β pygmæa, *Cat.* 4176 D (*a dwarf form*). *Royle Ill.* t. 19 C; *Hassk. in Miq. Mus. Bot.* i. 164.

Temp. Himalaya, alt. 4–7000 ft., from Chamba to Sikkim; Khasia Mts.

Stems 4–8 in., erect or ascending, leafy. *Leaves* 1–2 in., tip rounded, mucronate or not; petiole very short. *Racemes* very short, dense-flowered, rarely terminal. *Flowers* $\frac{1}{4}$–$\frac{1}{3}$ in. long, very shortly pedicelled; bracts minute. *Wings* with rounded tips, twice as long as the capsule. *Capsule* broader than long, notched, strongly ciliate. *Seeds* hairy; strophiole with 2 small ovate appendages.

†† *Herbs. Wings petaloid, membranous. Strophiole without appendages.*

5. **P. abyssinica,** *Fresen. in Mus. Senk.* ii. 273; perennial, stems erect, glabrous, leaves narrow-linear, racemes terminal long lax-flowered, bracts ovate, seeds covered with long hairs. *Oliv. Fl. Trop. Afric.* i. 130. P. Gerardiana, *Wall. Cat.* 4187; *Hassk. in Miq. Ann. Mus.* i. 173. P. scabra, *Edgew. in Trans. Linn. Soc.* xx. 33.

Subtrop. and Temp. Himalaya, alt. 3–8000 ft., from Marri to Kumaon, *Jacquemont*, &c.; Punjab at Moultan, *Edgeworth*.—Distrib. Affghanistan; Abyssinia to Natal.

Branches 8–18 in., very numerous, slender, ascending from a woody stock, twiggy. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., very narrow, acuminate, scarcely petioled. *Raceme* 2–6 in., very slender, naked. *Flowers* $\frac{1}{4}$ in. long, secund or subsecund; bracts caducous, narrow-ovate, margins membranous as are the outer sepals. *Wings* obovate, obtuse, nerved. *Capsule* obovate, emarginate, narrowly winged. *Seeds* densely hairy, hairs longer than the seed; strophiole galeate.

6. **P. leptalea,** *DC. Prodr.* i. 325; perennial, stems erect glabrous, habit of *P. abyssinica*, but racemes dense-flowered, flowers smaller, seeds silky. *Wall. Cat.* 4189; *Benth. Fl. Austral.* i. 139; *Hassk. in Miq. Ann. Mus.* i. 173. P. oligophylla, *DC. l. c.* 325; *Wall. Cat.* 4188. P. discolor, *Ham. in Don Prodr.* 199.

Subtrop. Himalaya, from Kashmir to Nipal; Behar; Khasia Mts., ascending to 4000 ft.; Nilghiri Mts.; Rangoon, Ava, Ceylon,—Distrib. Australia.

Very similar to *P. abyssinica*. *Stems* deeply furrowed. *Lower leaves* often oblong-lanceolate. *Racemes* 1–2 in., naked. *Flowers* $\frac{1}{8}$–$\frac{1}{4}$ in., subsecund; bracts twice as long as the buds, deciduous immediately after the flower expands. *Wings* much narrowed below. *Strophiole* small, galeate.

7. **P. Hohenackeriana,** *Fisch. & Mey. Ind. Sem. Hort. Petrop.* iv. 42; hoary, stems many short from a perennial stock, leaves oblong lanceolate or obovate-lanceolate obtuse or subacute, racemes short terminal many-flowered, upper outer sepal much the largest obtuse, wings broad elliptic obtuse very membranous, capsule very broadly winged. P. Hohenackeriana *var.* Stocksiana, *Boiss. Fl. Orient.* i. 472. P. supina *var.* Hohenackeriana, *Regel Pl. Raddi* t. 7, 6, 12.

Western Punjab, Attock, *Vicary*; Waziristan, ascending to 3500 ft., *Stewart*.—Distrib. Affghanistan and Beluchistan, Persia, Caucasus.

Stems 2–3 in., much branched from the base, suberect, hoary or pubescent. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in., pale, hoary, at length glabrous, nerveless. *Racemes* $\frac{1}{4}$–$\frac{1}{3}$ in., subsessile, dense-flowered. *Flowers* drooping, nearly $\frac{1}{4}$ in. long; pedicels short, bracts small. *Sepals* with broad scarious margins, upper linear-obovate, 2 lateral very small oblong obtuse; wings white, veins very delicate not anastomosing. *Capsule* $\frac{1}{6}$ in.; glabrous, orbicular, with a broad membranous wing. *Seeds* densely silky; strophiole with 2 appendages.

8. **P. persicariæfolia,** *DC. Prodr.* i. 326; annual, erect, leaves linear or elliptic-lanceolate, racemes terminal and extra-axillary, pedicels slender,

bracts subulate, wings broad-obovate. *Wall. Pl. As. Rar.* ii. t. 184, *Cat.* 4185; *Hassk. in Miq. Ann. Mus.* i. 176; *Oliver Fl. Trop. Afric.* i. 129. P. Wallichiana, *Wight Ill.* i. t. 22 A. P. granulata, *Hassk. l.c.* 179. P. Buchanani, *Ham. in Don Prod.* 199.

TEMP. and SUBTROP. HIMALAYA, alt. 5–9000 ft.; from Simla to E. Nipal. KHASIA MTS., alt. 2–4000 ft.; WESTERN PENINSULA, from the Dekkan to Travancor.—DISTRIB. Trop. Africa and Australia.

An erect or ascending slightly pubescent very much branched slender herb, 6–16 in. *Leaves* 1–2 in., flaccid, hardly petioled. *Racemes* 1–2 in., slender, lax-flowered. *Flowers* $\frac{1}{4}$ in. long; bracts small, subulate, pedicels curved. *Wings* orbicular-obovate or elliptic, obtuse, rather longer than the elliptic notched ciliate capsule. *Seeds* villous; strophiole small, galeate.

9. **P. erioptera,** *DC. Prodr.* i. 326; annual, erect or decumbent, leaves linear linear-oblong or obovate, racemes axillary or extra-axillary few-flowered, wings obliquely oblong, with a strong green midrib. *Wall. Cat.* 4173 A; *Deless. Ic. Sel.* iii. t. 15. P. Vahliana, *DC. l.c.* 326; *W. & A. Prodr.* i. 366. P. obtusata, *DC. l.c.* P. tomentosa, *Vahl ex Heyne mss.* P. triflora, *Oliv. Fl. Trop. Afric.* i. 128 (*not of Linn.*).

The PUNJAB; SCINDE; BEHAR; the WESTERN PENINSULA; AVA; BIRMA.—DISTRIB. Arabia, trop. Asia and Africa, (St. Vincent, introduced?).

Very variable in habit; branches numerous, erect or spreading from the base, stout or slender, 4–10 in. high. *Leaves* $\frac{1}{3}$–1 in. long, from obovate or almost obcordate to very narrow-linear. *Racemes* very short, $\frac{1}{4}$–$\frac{1}{2}$ in., few-flowered. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in.; pedicels slender; bracts minute. *Wings* always membranous in fruit, glabrous or pubescent, longer than the ovate notched pubescent capsule. *Seeds* densely hairy; strophiole galeate and inappendiculate.—Aden specimens have the root so woody as to appear perennial.

††† *Herbs. Wings herbaceous. Strophiole in- or* 3-*appendiculate.*

10. **P. glaucoides,** *Linn.* (*not of Wight*); stems wiry pubescent excessively numerous from a perennial stock, leaves elliptic or elliptic-lanceolate, racemes extra-axillary with slender peduncles 2–3 flowered equalling the leaves or shorter, outer-sepals acuminate, wings oblong acute. *DC. Prodr.* i. 326; *Wall. Cat.* 4171. ? P. confusa, *Hassk. l.c.* 165.

CEYLON; on banks at Newera Ellia.

Stems 4–8 in., pubescent or pilose. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in., glabrous or pilose, usually mucronate. *Racemes* about equalling the leaves. *Flowers* $\frac{1}{6}$–$\frac{1}{5}$ in. long; pedicels slender, sometimes longer; bracts subulate. *Outer sepals* subequal, ciliate; wings green, oblique. *Capsule* broadly obcordate or didymous. *Seeds* somewhat curved, slightly hairy; strophiole half the length of the seed, 3-appendiculate.—The two following forms of this plant are probably distinct species.

VAR. 1. *hirsutula*, Arn. Pugill. 4 (*sp.*); leaves broadly elliptic-ovate acute flat opaque. P. elongata β hirsutula, *Thwaites Enum.* 22; P. hypoglauca, *Hassk. in Miq. Ann. Mus.* i. 169.

VAR. 2; leaves linear-oblong acute shining nerved. P. rosmarinifolia *and* mucronata, *Thwaites Enum.* 22. P. arvensis β, *Thwaites l.c.* 400.

11. **P. elongata,** *Klein in Willd. Sp. Pl.* iii. 879; annual, erect or ascending, slender, leaves linear or linear-oblong obtuse acute or mucronate, racemes extra-axillary many-flowered longer than the leaves, outer sepals lanceolate acuminate, wings very oblique. *Wall. Cat.* 4168; *DC. Prodr.* i. 332; *W. & A. Prodr.* 38; *Thwaites Enum.* 22; *Hassk. in Miq. Ann. Mus.* i. 172. P. Wightiana, *Wall. Cat.* 4190; *W. & A. Prodr.* 38; *Hassk. l.c.* P. campestris, *Dalz. in Hook. Kew Journ. Bot.* ii. 40; *Dalz. &*

Gibs. Fl. Bomb. 13 (*not of Benth.*). P. macrostachya *and* eumekes, *Hassk. l.c.* 171, 172.

Western Peninsula, from the Concan southwards. Ceylon, *Walker.*

Stems 6–10 in., branching from the base, glabrous pilose or pubescent. *Leaves* $\frac{1}{3}$–$2\frac{1}{2}$ by $\frac{1}{10}$–$\frac{1}{4}$ in., acuminate, margins thickened, costa prominent beneath, upper surface often shining. *Racemes* 3–5 in., laxly many-flowered. *Flowers* $\frac{1}{6}$ in., yellow; pedicels slender; bracts minute *Outer sepals* subequal; wings equalling the corolla, falcate, obovate or hatchet-shaped, acute obtuse or acuminate. *Capsule* didymous, narrower upwards, narrowly winged, notched, glabrous. *Seeds* villous; strophiole galeate, appendages 3, very small.—*P. Wightiana* is the narrower leaved form.

12. **P. chinensis,** *Linn.*; annual, erect or diffuse, leaves from orbicular-oblong or obcordate to narrow linear, racemes short axillary and extra-axillary dense-flowered, flowers horizontal or pendulous, outer sepals small ovate, wings very oblique acute. P. arvensis, *Willd. Sp. Pl.* iii. 876; *DC. Prod.* i. 326; *Roxb. Fl. Ind.* iii. 218; *W. & A. Prodr.* i. 36; *Thwaites Enum.* 400. ? P. prostrata, *Willd. l.c.* 896; *DC. l.c.* 333. P. Rothiana, *W. & A. Prodr.* i. 37; *Hassk. in Miq. Ann. Mus.* i. 162. P. Tranquebarica, *Mart. ex Hb. Wight.* 135; *W. & A. Prodr.* i. 37. P. glaucoides, *Wight in Wall. Cat.* 4171 (*not of Linn.*). P. grandiflora, *Hb. Wight., Wall. Cat.* 4175. P. brachystachya, *DC. l.c.* 326 (*not of Blume*). P. procumbens, *Roth Nov. Sp.* 329; *DC. l.c.* 326. P. exigua, *Hassk. l.c.* 173.

Throughout India, from the Punjab to Pegu, and in the Western Peninsula, and Ceylon.—Distrib. Trop. Asia and Australia.

A most variable, usually procumbent, leafy, rather stout herb; 3–10 in. high, glabrous or pubescent. *Leaves* excessively variable, $\frac{1}{3}$–2 in. long, sometimes quite obcordate, at others almost orbicular, rather thick and coriaceous, glabrous, ciliate, hoary, or pubescent, margins usually flat, opaque. *Racemes* much shorter than the leaves, truncate, almost capitate. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in. long. *Wings* longer than the suborbicular notched ciliate narrowly winged capsule, green, falcate, obovate, acute, margins membranous. *Crest* of corolla often small. *Seeds* silky; strophiole with 3 very short appendages.—Linnæus having described the crest as unbearded, this was not identified by De Candolle with Willdenow's *arvensis*, but was placed in another section of the genus. The specimens in the Linn. Herb. are however decisive. It is linked by either intermediate or mimicking forms with various other species.

Var. *triflora*, Linn. (*Sp.*), racemes elongate, sometimes twice as long as the leaves, lax-flowered. P. multibracteata, *Wall. Cat.* 4174. P. ramosa, *Hb. Wight., Wall. Cat.* 4177. P. ciliata, *Hb. Wight.* P. Kleinii, *Hassk. in Miq. Ann. Mus.* i. 158.—Chiefly in the Western Peninsula.

Var. *brachystachya*, Blume Bijd. 59 (*Sp., not of DC.*); stems very slender prostrate, leaves very narrow glabrous, racemes very slender few-flowered, flowers minute, $\frac{1}{10}$ in. long. *Hassk. in Miq. Ann. Mus.* i. 157. Malacca, Griffith. Western Peninsula? (P. glabra, *Heyne in Herb. Wight.*) (Java).—Perhaps a distinct species, the flowers are remarkably small and the habit is peculiar.

13. **P. rosmarinifolia,** *W. & A. Prodr.* i. 37; annual, stems many slender erect or decumbent, leaves narrow linear, racemes axillary and extra-axillary short erect few-flowered, flowers shortly pedicelled erect, outer sepals acute, wings obliquely obovate acuminate, capsules ciliate. *Thwaites Enum.* 22, 400. P. Tranquebarica, *Wight in Wall. Cat.* 4169. ? P. Arnottiana, *Steud. Nomencl.* 370; *Hassk. in Miq. Ann. Mus.* i. 159. P. triflora, *Hassk. l.c.* 175 (*not Linn.*). P. linarifolia, *Heyne* according to *Hassk. l.c.*

Southern parts of the Western Peninsula and Ceylon.

Stems many from the root, 4–18 in., twiggy, pubescent. *Leaves* $\frac{1}{2}$–2 in., glabrous or pubescent, narrow-linear very rarely oblong or narrowed to the base erect, or suberect, margin often thickened or recurved, midrib strong. *Flowers* $\frac{1}{8}$ in. long, few, green, erect, which gives a remarkable habit to the plant. *Capsule* as in *P. chinensis* but usually hairy on the surfaces as well as on the margins.—The erect leaves and flowers seem to afford a good character for this.

** Bracts caducous (before flowering). Strophiole 3-appendiculate.

14. **P. sibirica,** L.; stems many slender ascending from a perennial stock, leaves from orbicular to elliptic-lanceolate and linear shining margins often recurved, racemes axillary and extra-axillary sub-erect laxly few- or many-flowered, outer sepals subequal oblong ovate or lanceolate, crest usually large, wings obliquely oblong or obovate obtuse or acute, capsule rather broadly winged glabrous not ciliate. *DC. Prodr.* i. 324; *Ledeb. Ic.* t. 448. P. japonica, *Houtt. Syst.* 8, t. 62, f. 1; *DC. l.c.*; *Hassk. in Miq. Ann. Mus.* i. 181. P. vulgaris, *Thunb. Fl. Jap.* 277 (*not of Linn.*). P. elegans, *Wall. Cat.* 4186; *Hassk. l.c.* 176. P. myrsinites, *Royle Ill.* t. 19 A. P. Khasiana, *Hassk. l.c.* 176. P. monopetala, *Camb. in Jacq. Voy. Bot.* t. 27; *Polyg. sp.* 3, *Griff.*; *Notul.* iv. 337, *Ic. Pl.* t. 597.

TEMP. and SUBTROP. HIMALAYA, alt. 1–6000 ft. (8000 in Sikkim), from the Punjab and N.W. frontier to Bhotan; Khasia Mts., alt. 4–6000 ft.; NILGHIRI MTS. (var. 1); CEYLON (var. 2).—DISTRIB. China, Japan, Siberia.

Very variable, but quite distinct from any other Indian species, usually best recognised by the shining reticulate upper surfaces of the elliptic-lanceolate leaves, and slender extra-axillary racemes, rather large ($\frac{1}{4}$–$\frac{1}{3}$ in.) and conspicuous erect flowers; but all these characters are excessively variable.—*Stems* 3–18 in., pubescent. *Leaves* $\frac{1}{2}$–2 in. *Racemes* 1–3 in.; bracts deciduous or persistent. *Outer sepals* short or long, obtuse acute or acuminate. *Wings* straight or oblique, membranous or subherbaceous, obtuse or acute, rarely acuminate. *Capsules* always glabrous, with a broader wing than in *P. chinensis*. *Seeds* pilose; strophiole with usually 3 short appendages.

VAR. 1. *Heyneana*, Wall. Cat. 4184 (*Sp.*); stouter, leaves linear oblong coriaceous, midrib stout, margins usually strongly recurved, wings herbaceous acuminate, appendages of the strophiole larger.—*W. & A. Prodr.* i. 38. *Hassk. in Miq. Ann. Mus* i. 160.—Pulney and NILGHIRI MTS. Obviously a form of *P. japonica*, from which some specimens are hardly distinguishable.

VAR. 2. *macrolophos*, Hassk. in Miq. Ann. Mus. i. 167 (*Sp.*); stems 1–2 ft. very slender, leaves 1–1$\frac{1}{2}$ in. broadly elliptic or lanceolate subacute flat, nerves obscure, outer sepals acuminate, wings herbaceous. P. glomerata *and* pedunculosa, *Thwaites Enum.* 400 (*not of Lour.*). Ceylon, Adam's Peak, &c., alt. 4–7000 ft.—A very large form, quite unlike the usual states.

15. **P. telephioides,** *Willd. Sp. Pl.* iii. 876; annual, stems prostrate short leafy, leaves small glabrous often imbricate very thick obovate or oblong obtuse or acute, flowers very small fascicled on very short extra-axillary peduncles, outer sepals acute, wings herbaceous oblique acuminate, capsule glabrous margined not ciliate. *DC. Prodr.* i. 332; *W. & A. Prodr.* i. 36? P. serpyllifolia, *Poir. Dict.* v. 499; *DC. l.c.* 326. P. buxiformis, *Hassk. in Miq. Mus. Bot.* i. 161.

WESTERN PENINSULA, Carnatic and Travancor; CEYLON.—DISTRIB. Indian Archipelago, China, Philippines.

Stems very many from an annual woody root, not exceeding 2–4 in. high in our numerous specimens from various collectors; pubescent. *Leaves* sessile, $\frac{1}{2}$–$\frac{3}{4}$ in., margins usually recurved. *Flowers* $\frac{1}{10}$ in. long. *Capsule* $\frac{1}{12}$ in. long and broad, deeply notched, valves margined. *Seeds* minute, silky; strophiole minutely appendaged.—A very distinct species, easily recognised by its dwarf stature, the thick short leaves, small flowers and fruit, and glabrous small capsule that is not winged.

16. **P. glomerata,** *Lour. Fl. Coch.* 426; stems tall erect or ascending, leaves large from broad-ovate and oblong to elliptic lanceolate and linear, racemes extra-axillary very short, 2–3-flowered flowers drooping, outer sepals acuminate, wings herbaceous hatchet-shaped acuminate and awned, capsule narrowly winged strongly ciliate. *DC. Prod.* i. 326. P. densiflora, *Blume Bijd.* 59; *Hassk. in Miq. Mus. Bot.* i. 166. P. depauperata, *Wall. Cat.* 4180.

Eastern Himalaya, hot valleys of Sikkim, alt. 1–6000 ft.; Oude; Assam; Khasia Mts., alt. 0–5000 ft.; Tenasserim —Distrib. Eastern Archipelago, China.

Stems many from a woody stock, 1–2 ft. high, densely pubescent, curved. *Leaves* very variable, 1½–2½ in., flat, glabrous or hairy, not veined, sessile or shortly petioled, sometimes cordate. *Racemes* scattered, small; peduncles shorter than the flowers, which are ¼–⅓ in. long, green *Outer sepals* subequal, acute, ciliate. *Crest* very small. *Capsule* ⅕ in. broad and long, 2-lobed. *Seeds* large, silky, obovoid; strophiole with 3 short appendages.—Thwaites's specimen named *glomerata* resembles it in habit, but differs totally in the capsule and seed; they no doubt belong to a large state of *P. japonica* (see var. *elata*).

DOUBTFUL SPECIES.

P. linarifolia, Willd. Sp. Pl. iii. 877 (linearifolia, DC. Prodr. i. 326).
P. procumbens, Roth. Nov. Sp. 329; DC. Prodr. i. 326.—Ind. Or.
P. varians, Mart. DC. l.c. 332.—Bengal.
P. umbrosa, Mart. DC. l.c.—Bengal.
P. macropetala, Hassk. l.c., perhaps P. japonica var. 2.

2. SALOMONIA, Lour.

Leafy diffuse annuals, or (Sect. Epirhizanthes) parasites, with leaves reduced to scales. *Flowers* minute, in dense terminal spikes. *Sepals* nearly equal, 2 interior somewhat larger. *Petals* 3, united at the base with the staminal tube, the inferior keel-shaped, galeate, not crested. *Stamens* 4–5, filaments united for their lower half into a sheath; anthers opening by pores. *Ovary* 2-celled, each cell with one pendulous ovule. *Capsule* much compressed laterally, 2-celled, loculicidal, margins toothed. *Seeds* albuminous, not or scarcely strophiolate.—Distrib. Species about 8, natives of Eastern tropical Asia and tropical Australia.

Sect. I. **Salomonia,** DC. Stems leafy.

1. **S. cantoniensis,** *Lour. Fl. Coch.* 14; stem winged, leaves cordate-ovate shortly petioled, spikes rather lax, capsule with triangular teeth. *Wall. Cat.* 4192; *DC. Prodr.* i. 334; *Benth. Fl. Hongk.* 44; *Miq. Flor. Ned. Ind.* i. pt. 2, 127; *Hassk. in Miq. Ann. Mus.* i. 144. S. subrotunda, *Hassk. l.c.*—Salomonia, sp. 3 *in Griff. Notul.* iv. 539.

Eastern Bengal; Assam; Khasia Mts., alt. 0–4000 ft.; Eastern Peninsula.—Distrib. Malayan Archipelago.

A weedy erect much-branched diffuse annual, 3–6 in. *Leaves* large, paler beneath. *Spikes* numerous, terminal, lax below, denser above. *Bracts* minute, early deciduous. *Flowers* minute, quite sessile. *Sepals* linear-subulate. *Petals* united below, the two lateral shorter than the keel. *Capsule* very small, broader than long, armed with a row of recurved triangular teeth. *Seeds* black, shining, not strophiolate.

2. **S. ciliata,** *DC. Prodr.* i. 334; stem furrowed, leaves sessile cordate-amplexicaul ciliate, spike very dense, capsule with filiform teeth. S. cor-

data, *Arn. Pug. Ind.* 4; *Wight. Ill.* i. t. 22 C; *Thwaites Enum.* 22 (*excl. synons.*); *Hassk. in Miq. Ann. Mus. Lugd.-Bat.* i. 145. ? S. angulata, *Griff. Notul.* iv. 539. Polygala ciliata, *Linn.*

CEYLON, in swampy ground.

Stouter than *S. cantoniensis*. *Stem* erect, glabrous, furrowed, scarcely winged. *Leaves* small, strongly ciliate. *Flowers* crowded, small, pink, sessile. *Sepals* lanceolate, ciliate. *Capsule* small, broader than long, with a row of red filiform teeth. *Seeds* black, shining, with a small membranous strophiole.—Wight and Arnott are in error in taking Linnæus's *Polygala ciliata* for a true *Polygala*. The specimen in Herb. Burman. in the British Museum, clearly shows it to be a *Salomonia*, and identical with Arnott's *S. cordata*.

3. **S. oblongifolia,** *DC. Prodr.* i. 354; leaves elliptic or ovate-lanceolate not ciliate, teeth of capsule filiform. *Hassk. in Miq. Ann. Mus. Lugd.-Bat.* i. 147; *Arn. Pug. Ind.* 4; *Deless. Ic. Sel.* iii. t. 19. S. sessiliflora, *Ham. in Don Prodr.* 201. S. obovata, *Wight Ill.* i. t. 22 B. S. canarana, rigida, ? Horneri, ? uncinata *and* ? setosa-ciliata, *Hassk. l.c.* 147, 148, 149. ? S. stricta, *Sieb. et Zucc. Abh. d. k. baier. Akad. d. Wiss.* iv. 2, 152. S. leptostachya, *Wall. Cat.* 4193. Polygala canarana *and* Arnottiana, *Hassk. l.c.*

SUBTROP. HIMALAYA, from Nipal to Sikkim; KHASIA MTS.; EASTERN and WESTERN PENINSULAS; CEYLON.—DISTRIB. Malayan Archipelago, Australia.

A simple or branched annual. *Leaves* larger than in *S. ciliata*, sessile, not cordate, margins with a few long distant hairs. *Bracts* linear, often persistent at time of flowering. *Flowers* crowded, small, pink. *Sepals* nearly equal, lanceolate, slightly ciliate. *Lateral petals* much shorter than keel. *Capsule* small, with a row of red teeth. *Seeds* black, shining, not strophiolate.—Very near the last, but probably distinct.

4. **S. edentula,** *DC. Prodr.* i. 334; stem much-branched winged, leaves cordate-triangular very shortly petioled, capsule scarcely toothed. *Hassk. in Miq. Ann. Mus. Lugd.-Bat.* i. 146; *Wall. Cat.* 4194. S. petiolata, *Ham. in Don Prodr.* 200.

NIPAL, *Wallich.*

A low, glabrous annual. *Spikes* lax below, denser above. *Flowers* minute. *Bracts* minute, deciduous. *Sepals* very small, ovate. *Lateral* petals broad and nearly as long as the galeate keel. *Capsule* very small, membranous, not ciliate, minutely toothed. *Seeds* black, shining, not strophiolate.

SECT. II. **Epirhizanthes,** *Blume* (gen.). Parasitic; leaves 0 or reduced to scales.

5. **S. aphylla,** *Griff. in Trans. Linn. Soc.* xix. 342. S. parasitica. *Griff. Notul.* iv. 538. S. tenella, *Hook. f. in Trans. Linn. Soc.* xxiii. 158.

MALACCA and TENASSERIM, *Griffith.*—DISTRIB. Borneo.

A brown parasite, associated with *Thismia Brunoniana* and a *Burmannia* (Griff.). *Stem* 3–6 in., ascending, sparingly divided. *Leaves* reduced to a few distant brown scales. *Spikes* numerous, elongated, very dense. *Bracts* minute, persistent after flowering. *Flowers* minute, brown. *Sepals* distinct, broadly ovate. *Capsule* membranous, broader than long, not ciliate. *Seeds* minute, black, with a small appendiculate strophiole.

3. SECURIDACA, Linn.

Shrubs, almost always scandent. *Flowers* in terminal or axillary usually compound racemes. *Sepals* deciduous, 2 inner (*wings*) larger and petaloid. *Lateral petals* nearly or quite distinct from the galeate crested keel, superior petals 0. *Stamens* 8, filaments united; anthers 2-celled, dehiscing by oblique pores. *Ovary* 1-celled, 1-ovuled. *Fruit* a 1-celled samara, 1-seeded, wing broad coriaceous. *Seeds* exalbuminous, estrophiolate. — DISTRIB. Species about 25; most numerous in tropical America, rarer in tropical Africa and Asia.

1. **S. Tavoyana,** *Wall. Cat.* 4196; leaves elliptic or obovate-oblong minutely pubescent beneath, flowers in loose subcorymbose panicles, wings elliptic. S. scandens, *Ham. in Wall. Cat.* 4195 (*not of Jacq.*); *Hassk. in Miq. Ann. Mus.* i. 190. S. paniculata, *Wall.* (*not of Lamk.*). S. inappendiculata, *Hassk. Pl. Jav. Rar.* 295. Lophostylis javanica, *Miq. Fl. Ned. Ind.* i. pt. 2, 128.

EASTERN BENGAL, from Silhet and Chittagong to Rangoon.—DISTRIB. Java, China.

A large woody scandent shrub; branches striate, branchlets puberulous. *Leaves* 3–5 by 1½–2 in., generally acuminate, glabrous, paler beneath. *Flowers* ¼ in., the lower with considerably longer (½ in.) pedicels than the upper. Outer *sepals* nearly equal, ovate, shortly ciliate; wings elliptic, obtuse. *Lateral petals* adnate at the base to the keel, truncate; keel with a conspicuous but scarcely fimbriate crest. *Ovary* orbicular; style unilateral, curved at right angles near the tip. *Samara* 2½–3¼ in.; nucleus very rugose; wing very large and strongly veined, oblique, tip rounded, margin entire, veins arched.

2. **S. bracteata,** *A. W. Benn.*; leaves elliptic puberulous beneath, flowers in panicled racemes, wings orbicular, wing of fruit strongly veined.

MALACCA, *Maingay.*

A large scandent shrub; branches terete, hoary-pubescent. *Leaves* elliptic, acuminate, margins revolute when dry, beneath finely pubescent glaucous. *Flowers* ½ in., pedicels ⅓ in. *Bracts* ovate, acuminate, pubescent, persistent after flowering. *Outer sepals* nearly equal, large, ovate, very hairy, ciliate: wings scarcely twice as long, pubescent externally. *Lateral petals* truncate; keel with a recurved, plaited crest. *Ovary* orbicular; style curved. *Fruit* unknown. *Samara* 3–3½ in., similar to that of *S. Tavoyana*, but contracted for a longer space above the nucleus.

4. TRIGONIASTRUM, *Miquel.*

A shrub or small tree. *Leaves* hoary beneath. *Flowers* in slender terminal panicles. *Petals* 5, unequal, the inferior keel-shaped. *Stamens* 5, filaments united into a sheath. *Ovary* densely hairy, 3-locular; ovules pendulous, solitary in each cell. *Fruit* of 3 samaroid ultimately almost distinct carpels. *Seeds* 1 in each carpel, not strophiolate.

1. **T. hypoleucum,** *Miq. Fl. Ned. Ind. Suppl.* i. 395. Isopteris penangiana, *Wall. Cat.* 7261.

PENANG *Porter*; Malacca *Maingay.*

Branches slender, terete; branchlets hoary. *Leaves* 4–7 by 1½–2½ in., elliptic-lanceolate, obtusely acuminate, pale beneath and with very fine adpressed pubescence; petiole $\frac{1}{10}$–⅛ in. *Panicles* much branched, lax, slender. *Flowers* ¼ in. diam., shortly pedicelled, tomentose. *Sepals* 5, 2 exterior rather larger. *Ovary* densely hairy. *Samara* 2 in. long, membranous, dimidiate-obovate, strongly reticulate, shining; nucleus small.

5. XANTHOPHYLLUM, Roxburgh.

Timber-trees. *Leaves* large, coriaceous, generally yellow-green. *Sepals* 5, nearly equal. *Petals* 5 or 4, nearly equal, the inferior keel-shaped, not crested. *Stamens* 8, distinct, 2 hypogynous, 6 attached to the base of the petals. *Ovary* stipitate, 1-celled; style curved; ovules various in number and insertion. *Fruit* 1-celled, indehiscent, 1-seeded. *Seeds* exalbuminous, estrophiolate.—DISTRIB. Species about 15. Most abundant in the Archipelago and Malacca; a few species are Continental Indian, and one is N. Australian.

* Ovules 4–8, rarely more (8–14 in *X. affine*).

1. **X. flavescens,** *Roxb. Cor. Pl.* iii. t. 248; leaves coriaceous elliptic-lanceolate not glaucous beneath yellow-green when dry, panicle diffuse closely pubescent, sepals unequal, ovary and style strigose, fruit glabrous. *W. & A. Prodr.* 39. X. paniculatum, *Miquel Fl. Ned. Ind. Suppl.* i. 393. X. Arnottianum, undulatum, *and* Roxburghianum, *Wight Ill.* i. 50; *Beddome Flor. Sylvat.* (*Anal.*) t. 3.—*Rheede Hort. Malab.* iv. t. 23.

EAST BENGAL; Silhet, and Chittagong. WESTERN PENINSULA. CEYLON.—DISTRIB. Sumatra, Java.

A timber tree. *Leaves* 4–7 by $1\frac{1}{2}$–3 in., shining above, less so and veins much reticulated beneath, with 5–7 principal nerves on each side, and more or less scattered perforated glands (which are sometimes absent) at the axils of the nerves or elsewhere. *Flowers* $\frac{1}{3}$–$\frac{1}{2}$ in. long, yellow; pedicels very variable, $\frac{1}{6}$–$\frac{2}{3}$ in. *Sepals* unequal, suborbicular, finely tomentose. *Ovary* globose, densely strigose; ovules 4, 2 erect and 2 pendulous, or more numerous and subhorizontal. *Fruit* globose, $\frac{2}{3}$ in. diam., and upwards, walls very thick, green.—Very variable. I am unable to distinguish between Roxburgh's *flavescens* and *virens*, both usually having pitted glands on the leaf beneath, except by the long pedicels of the latter, the Ceylon specimens of which have 4 ovules, and the Silhet ones usually the same, whilst the Peninsula ones vary 4–9, and Sumatran specimens are 4-ovuled.

VAR. 1. *flavescens proper*; leaves broad, panicle close axillary or terminal, pedicels short, ovules 4–12. Chittagong and Western Peninsula (Sumatra, Java).

VAR. 2. *angustifolium*, Wight Ill. 50, t. 23 (*sp.*); leaves narrower, ovules usually 4. *Beddome Fl. Sylvat. Anal. Gen.* t. 3.

VAR. 3. *virens*, Roxb. Cor. Pl. t. 248 (*sp.*); panicles short supra-axillary, pedicels very slender, ovules 4. X. flavescens, *Roxb.?*; *Wight l.c.*; *Beddome Fl. Sylvat. Anal. Gen.* t. 3. Ceylon, Silhet; Paupanassum hills (Travancor?), alt. 2–3000 ft., *Beddome*.

2. **X. affine,** *Korth. in Miq. Ann. Mus.* i. 271; leaves coriaceous oblong- or elliptic-lanceolate not glaucous beneath yellow-green when dry, panicles axillary and terminal diffuse tomentose, sepals unequal, ovary glabrous, style strigose. X. flavescens, *Wall. Cat.* 4198, *not of Roxb.*

EASTERN PENINSULA; Tenasserim to Malacca and Penang, *Wallich*, &c.—DISTRIB. Sumatra, Java, Borneo.

So like the *X. flavescens*, that the larger leaves, rather larger flowers, more tomentose calyx, and glabrous larger ovary, alone distinguish it in the dried state. The ovules vary from 8–14, and the fruit is quite glabrous, green, globose and thick-walled.

3. **X. glaucum,** *Wall. Cat.* 4199; branches very slender, leaves usually membranous elliptic or lanceolate acuminate glaucous beneath, nerves very numerous 8–10 on each side, panicle large open lax, branches long tomentose, calyx pubescent or tomentose, ovary and style strigose, fruit glabrous. *Hassk. in Miq. Ann. Mus.* i. 193.

EASTERN PENINSULA; Rangoon and Tenasserim in moist places.

A small tree; branches terete, very slender, dark red-brown, glabrous. *Leaves* 3–4 by 1–$1\frac{1}{2}$ in., rather abruptly acuminate, quite glabrous, finely reticulate; petiole slender, $\frac{1}{3}$ in. *Panicle* 1 ft., with long spreading very slender tomentose simple branches. *Flowers* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., and slender pedicels pubescent, pale when dry. *Ovary* sessile, covered with dense strigose hairs, ovules 4. *Fruit* much smaller than in *X. flavescens*, $\frac{1}{3}$–$\frac{1}{2}$ in. diam., quite smooth and glabrous.—Easily distinguished by its slender habit, and glaucous membranous leaves, which are very pale beneath, with numerous slender much reticulated veins.

4. **X. Griffithii,** *Hook. f.;* branches usually robust, leaves very coriaceous elliptic or elliptic lanceolate acute or acuminate with few (5–6) principal nerves on each side glaucous beneath, panicle spreading tomentose, calyx pubescent, ovary and style strigose.

MERGUI, *Griffith, Helfer;* MALACCA, *Maingay.*

Very much more robust than *X. glaucum,* with very coriaceous leaves, 3–5 in. long; branches very dark brown, smooth, terete; branchlets often extra-axillary with two opposite lateral coriaceous oblong scales at the base (persistent first leaves of the bud). *Flowers* nearly $\frac{1}{3}$ in. long, on short stout pedicels, smaller in the Mergui specimens, and darker when dry. *Sepals* orbicular-ovate, subequal. *Petals* linear-spathulate, glabrous, except the pubescent keel. *Ovary* sessile and style strigose, ovules 4. *Fruit* in a Mergui species the size of a pea, slightly pubescent, shining (perhaps immature).

Large leaved specimens of this or a closely allied species, gathered in the Andamans by Helfer, but without flowers, resemble the leaves of *X. acuminatissimum,* Miquel.

5. **X. Maingayi,** *Hook. f.;* branches very slender, leaves membranous elliptic-lanceolate obtusely caudate-acuminate not glaucous beneath, principal nerves 5–6 on each side, racemes slender simple and panicled, calyx pubescent, ovary and style strigose, fruit densely pubescent.

MALACCA, *Griffith, Maingay.*

Branches glabrous, pale yellow-brown, branchlets tomentose. *Leaves* 2–3 by $1\frac{1}{4}$–$1\frac{1}{2}$ in., pale green when dry, sometimes almost white beneath, but scarcely glaucous; petiole very slender, $\frac{1}{10}$–$\frac{1}{8}$ in. *Racemes* 1–2 in., axillary and terminal, the latter often panicled, branches very slender finely pubescent with pale buff down. *Flowers* lax, $\frac{1}{4}$ in. long; pedicels short, slender. *Sepals* unequal, orbicular-ovate, obtuse, buff-pubescent. *Petals* glabrous, except the keel. *Ovary* and style strigose, ovules 4. *Fruit* $\frac{2}{3}$ in. diam., globose; walls thick, rugose when dry.

** Ovules numerous. (See also 2. *X. affine.*)

† *Flowers panicled.*

6. **X. stipitatum,** *A. W. Benn.;* branches very slender, leaves membranous elliptic obtusely caudate-acuminate glaucous beneath, nerves indistinct, racemes sparingly branched pubescent, calyx puberulous ciliate, ovary cottony stipitate.

MALACCA, *Maingay.*

Branchlets glabrous, dull brown. *Leaves* 2 by $\frac{3}{4}$ in., dull pale leaden-brown when dry, rather coriaceous, shining above, opaque beneath, with very obscure nerves; petiole $\frac{1}{10}$ in. *Panicle* sparingly branched; branches long, slender. *Flowers* $\frac{1}{3}$ in. long, dull red, shorter than the slender pedicels. *Sepals* subequal, broadly oblong, obscurely puberulous. *Petals* about twice as long, ciliate when young. *Filaments* villous below the middle. *Ovary* narrowed into a glabrous stipes, and base of style loosely clothed with white cottony hairs; ovules 10–12.

7. **X. rufum,** *A. W. Benn.;* branchlets stout and leaves beneath rusty or rufous pubescent, leaves very coriaceous elliptic-ovate or oblong acuminate, nerves beneath few very stout, panicle large and calyces red-tomentose, ovary and style densely villous, fruit pubescent.

MALACCA, *Maingay.*

A large timber tree; branchlets very stout, densely tomentose. *Leaves* 5–7 by $1\frac{1}{2}$–3 in., clothed beneath with soft spreading pubescence, especially on the costa and nerves (6 on each side), pale yellow when dry, upper surface opaque, under paler;

petiole ¼–½ in. *Panicle* 6–10 in., branches stout, densely clothed with yellow-brown tomentum; branchlets and calyces ruddy brown. *Flowers* ¾ in. long; pedicels shorter than the sepals, bracts large, oblong. *Sepals* subequal, coriaceous, orbicular, deciduous, densely tomentose within and without. *Petals* three times as long, narrowly falcate-lanceolate, glabrous, except the broad tomentose keel. *Filaments* pilose at the base. *Ovary* sessile, rigid (when dry) and style densely pubescent to the top; ovules 14–16. *Fruit* dry (immature obscurely angled).

†† *Flowers racemose, racemes rarely panicled.*

8. **X. obscurum,** *A. W. Benn.;* branchlets stout, leaves very thickly coriaceous stout-petioled oblong obtuse glabrous dark brown when dry, racemes very short stout axillary few-flowered, calyx glabrous ciliate, ovary and style glabrous.

SINGAPORE, *Maingay.*

A large timber tree; branchlets woody, glabrous. *Leaves* 5–7 by 2–4 in., exceedingly thick, shining above, nerves 8–10 on each side reticulate, dark brown when dry; petiole ¼ in., very stout. *Racemes* 1–1½ in., stout, suberect, dark, few-flowered. *Flowers* ¼–⅓ in. long. *Sepals* unequal, orbicular, tips minutely ciliate. *Petals* all spathulate, subequal, glabrous, except on the claw and pubescent keel. *Ovary* ovoid and style quite glabrous; ovules 15–16 (*Maingay*).

9. **X. insigne,** *A. W. Benn.;* branchlets stout glabrous, leaves long-petioled very coriaceous ovate or elliptic-oblong obtuse glabrous, racemes simple short stout axillary and terminal, pedicels curved, sepals ciliate, ovary sessile and style glabrous.

MALACCA, *Maingay.*

A tree, not lofty; trunk thick; branchlets quite glabrous. *Leaves* 5–6 by 1¾–2½ in., base acute, dark brown when dry, shining above, nerves 6–8 on each side, loosely reticulate; petiole ¾–1 in., very thick. *Racemes* 3–4 in., sometimes panicled at the ends of the branches. *Flowers* ½–⅔ in. long, handsome, almost black when dry. *Sepals* unequal, suborbicular, puberulous. *Petals* spathulate, subequal, except the keel which is larger and silky near the tip; claw pubescent. *Ovary* ovoid; style slightly curved; ovules 12–14.

10. **X. ellipticum,** *Korth. in Miq. Ann. Mus.* i. 276; wholly glabrous, leaves rather coriaceous elliptic or elliptic-lanceolate obtusely caudate-acuminate not glaucous beneath strongly reticulate, racemes simple stout suberect, calyx ovary style and thin-walled fruit perfectly glabrous.

MALACCA, *Griffith.*—DISTRIB. Borneo.

Branchlets slender or stout. *Leaves* 3–4 by 1–1½ in., glossy above, very strongly reticulated on both surfaces, principal nerves about 6 on each side, pale brown when dry; petiole ¼ in. *Racemes* 1–3 in., rachis rather stout, angled. *Flowers* ¼ in. long, almost black when dry; pedicels equalling the calyx. *Sepals* orbicular, subequal, very coriaceous. *Petals* twice as long, very narrow, all quite glabrous. *Filaments* glabrous. *Ovary* and slender style perfectly glabrous; ovules 12–14. *Fruit* ¾ in. diam., sessile, chestnut-brown when dry with thin crustaceous walls.—There is a very faint pubescence on the buds and pedicels of the Bornean specimens.

ORDER XVII. **FRANKENIACEÆ.** (By M. P. Edgeworth, F.L.S.)

Annual or perennial herbs or undershrubs, with articulate branches. *Leaves* opposite, small, exstipulate. *Flowers* small, solitary in the forks of the branches, regular, hermaphrodite. *Calyx* gamosepalous, persistent with 4–6 divisions, induplicate valvate in bud. *Petals* equalling the sepals in number, hypogynous, free; claw with an adherent scale, imbricated in bud.

Stamens 4 or more, free, or connate at the base; anthers versatile, 2-celled. *Ovary* free, sessile, 1-celled; style slender, stigma 2–5-lobed; ovules many in two rows, amphitropous with the micropyle below; funicles slender. *Capsule* enclosed in the persistent calyx, opening by as many valves as there are placentas. *Seeds* oblong or ovoid, hilum sub-terminal, raphe linear, testa crustaceous; embryo straight, in the centre of mealy albumen.—A single genus, with about 12 species, natives of dry sandy and especially saline tracts.

1. **FRANKENIA,** Linn.

1. **F. pulverulenta,** *Linn.*; annual, prostrate, leaves obovate retuse or hoary beneath, calyx glabrous.—*Boiss. Fl. Orient.* i. 779.

Plains of the PUNJAB and SINDH, on Sola land.—DISTRIB. Eastward to S. Europe, Senegal, and S. Africa.

A slender, exceedingly branched, diffuse herb; branches wiry, leafy, 6–18 in. long. *Leaves* $\frac{1}{6}$–$\frac{1}{4}$ in., very shortly petioled. *Flowers* pink, shorter than the leaves. *Calyx* cylindric, strongly ribbed. *Petals* small.

ORDER XVIII. **CARYOPHYLLEÆ.** (By M. P. Edgeworth, F.L.S., & J. D. Hooker.)

Herbs, rarely undershrubs; branches opposite, usually jointed and thickened at the joints. *Leaves* opposite, quite entire or serrulate, often connate; stipules scarious or 0. *Flowers* rarely 1-sexual. *Sepals* 4–5, free or connate, imbricate in bud. *Petals* 4–5, rarely 0, inserted on a hypogynous ring, rarely perigynous. *Stamens* 8 or 10, rarely fewer, inserted with the petals; anthers 2-celled, cells parallel opening lengthwise. *Disk* small and annular, or elongated into a gynophore, or broken up into glands. *Ovary* free, 1-celled, or imperfectly 3–5-celled; styles 2–5, free, or connate into a single style, stigmatose on the inner side; ovules 2 or many, on slender basal funicles, or with the funicles united into a column, amphitropous. *Capsule* membranous or crustaceous, rarely fleshy, opening by valves equal in number or double that of the styles, rarely indehiscent or bursting irregularly. *Seeds* few or many, rarely solitary, reniform globose obovoid or flattened on one side; hilum marginal or central, albumen mealy, rarely fleshy; embryo usually more or less curved and surrounding the albumen, nearly straight in the discoid seeds, cotyledons narrow incumbent, rarely accumbent.—DISTRIB. Cosmopolitan, but chiefly Arctic, Alpine, European and W. Asiatic; Genera 35, species about 800.

TRIBE I. **Sileneæ.** *Calyx* gamosepalous, 4–5-lobed. *Petals* clawed and *stamens* inserted on an elongate gynophore (rarely sessile). *Styles* free.—Stipules 0.

Subtribe 1. DIANTHEÆ. Capsule dehiscent; styles 2. Seeds peltate, hilum facial; embryo straight.

Calyx bracteate, striate	1. DIANTHUS.
Calyx bracteate or not, 5–15-nerved	2. TUNICA.

Subtribe 2. DRYPIDEÆ. Capsule indehiscent. Hilum lateral; embryo curved.

Calyx 5–15-nerved. Styles 2	3. ACANTHOPHYLLUM.

Subtribe 3. LYCHNIDEÆ. Capsule bursting by short or long valves. Hilum lateral; embryo annular.

Calyx 5-nerved. Capsule 1-celled, deeply 4-valved; styles 2–3 4. GYPSOPHILA.
Calyx veined. Capsule shortly 4-valved; styles 2 . . . . . 5. SAPONARIA.
Calyx 10–∞-nerved. Capsule partially 3-celled, shortly 3–6-valved; styles 3 . . . . 6. SILENE.
Calyx 10-nerved. Fruit fleshy; styles 3 . . . . 7. CUCUBALUS.
Calyx 10-nerved. Capsule shortly 4–5- or 8–10-valved; styles 5 8. LYCHNIS.

TRIBE II. **Alsineæ.** *Sepals* free, or connate at the base only. *Petals* subsessile and *stamens* inserted on an annular disk, rarely perigynous. *Styles* free.

* *Stipules* 0. *Sepals free. Stamens hypogynous.*

Petals jagged. Capsule cylindric or conic, 6-valved. Styles 3. Seeds many, compressed . . . . 9. HOLOSTEUM.
Petals notched or entire. Capsule cylindric or conic, 8–10-valved. Styles 3–5, opposite the sepals. Seeds many . . 10. CERASTIUM.
Petals 2-fid. Capsule globose ovoid or oblong. Styles 3–5. Seeds few or many . . . . 11. STELLARIA.
Petals entire. Capsule depressed, 1-seeded Styles 2 . . . 12. BRACHYSTEMMA.
Petals entire or lacerate. Capsule of *Stellaria*. Styles usually 2–3. Seeds many . . . . 13. ARENARIA.
Petals entire, minute or 0. Capsule 4–5-valved. Stamens and styles 4 or 5 opposite the sepals . . . . 14. SAGINA.

** *Stipules* 0. *Sepals connate below into an obconic tube, bearing the stamens.*

Petals 0. 15. THYLACOSPERMUM.

*** *Stipules scarious. Sepals free.*

Petals entire. Styles 3 or 5. Capsules 3- or 5-valved . . 16. SPERGULA.

TRIBE III. **Polycarpeæ.** *Sepals* free. *Petals* subsessile and stamens inserted on an annular disk. *Styles* 3–2, combined. *Stipules* scarious, rarely obsolete.

Sepals not keeled. Petals 2–6-fid . . . . 17. DRYMARIA.
Sepals keeled. Petals entire. Style 3-fid . . . . 18. POLYCARPON.
Sepals scarious, not keeled. Stigma 3-toothed . . . . . 19. POLYCARPÆA.

1. **DIANTHUS**, Linn.

Herbs, usually perennial. *Leaves* linear. *Flowers* terminal, solitary or in panicled cymes. *Calyx* tubular, 5-toothed, finely striated (with 7–9 or 11 nerves to each tooth); base embraced by 2 or more imbricating bracts. *Petals* with a long claw; blade entire or toothed or fimbriate, claw without a scale. *Stamens* 10. *Disk* a long-stalked gynophore. *Ovary* 1-celled; styles 2. *Capsule* cylindric oblong or ovoid, 4-toothed or valved. *Seeds* orbicular or discoid, plane or concave, imbricated on the columnar placenta; embryo straight, excentric.—DISTRIB. Species about 70, natives of the N. temp. zone exclusive of Western N. America.

D. chinensis L. (*D. glaucus*, Hb. Ham. in Wall. Cat. 656) is commonly cultivated in India.

* Petals entire crenate or toothed, not fimbriate.

† *Petals smooth, surface not bearded.*

1. **D. Caryophyllus,** *Linn.;* leaves channelled, margin quite even, cymes loosely panicled, bracts 4 broadly obovate mucronate 3–4 times shorter than the calyx, petals toothed and crenate. (Carnation or Clove Pink.)

PUNJAB at Attok, *Falconer;* ? Balti, alt. 7–8000 ft., *Thomson.*—DISTRIB. Westward to mid-Europe.

Perennial, glabrous, glaucous; stems 18–24 in., branched and leafy below. *Leaves* 4–6 by ⅛ in. *Flowers* 1–1½ in. diam., fragrant. *Calyx* 1–1¼ in., teeth acute. *Petals* obovate, rosy, teeth ⅙–¼ the length of the blade. *Capsule* ovoid.—Thomson's Balti specimens are very old, and if properly referred here, belong to a form with more numerous bracts.

2. **D. Falconeri,** *Edgew.;* leaves channelled serrulate, flowers subsolitary, bracts 4 rarely 6 broad-ovate long-cuspidate 3–4 times shorter than the calyx, petals finely toothed.

WESTERN TIBET; Astor and Deotsu, *Falconer,* &c.

Shrubby below; stems 1–2 ft., stout, rigid, dichotomously branched. *Leaves* 3–6 by ⅛ in., 1–3-nerved. *Flowers* smaller than in *D. Caryophyllus.* *Calyx* 2 in., strongly striate; bracts suddenly contracted into the long cusp.

3. **D. Cachemiricus,** *Edgew.;* leaves channelled, margin thickened serrulate, flowers solitary or few, bracts 4 lanceolate with a long ensiform often foliaceous point sometimes equalling the calyx.

KASHMIR, *Falconer.*

Stems much branched from the base, more slender than *D. Falconeri,* erect. *Leaves* 1–1½ in., very narrow, midrib beneath stout. *Bracts* with either very slender points or long leafy ones. *Calyx* 1 in., teeth ovate-lanceolate, acuminate, margins scarious. *Petals* large, obovate; blade ½–⅔ by 1 in., margin toothed or almost entire.

4. **D. anatolicus,** *Boiss. Fl. Orient.* i. 489; small, slender, leaves very narrow margin much thickened serrulate, bracts 6 (4–8) very broad cuspidate ½–⅓ shorter than the calyx.

WESTERN TIBET, *Falconer;* Dras, 8–10,000 ft., *Thomson.*—DISTRIB. Armenia.

Densely tufted; stock woody, short, much branched; stems 6–10 in., very slender, strict, 1- or more-flowered. *Leaves* ½–¾ in., rigid, slender, with a very thick midrib and margin. *Bracts* with sometimes foliaceous points. *Calyx* ½ in., teeth subacute. *Petals* rosy, blade small, broad, crenate-toothed.

5. **D. Jacquemontii,** *Edgew.;* leaves narrow, radical serrulate, cauline with thickened obscurely serrulate margins, bracts 4 very broad obtuse acute or cuspidate ¼ the length of the calyx, calyx-teeth pungent.

WESTERN HIMALAYA, Kashmir, alt. 5–6000 ft., *Jacquemont,* &c.

Stems 4–10 in., many from a tufted woody stock, rather slender. *Leaves* 1–1½ in., coriaceous, green when dry, flat above, acute. *Flowers* usually solitary. *Bracts* suddenly contracted into a point which is sometimes thickened and quite obtuse. *Calyx* ¾–1 in., teeth long, with rigid tips. *Petals* broad, rather deeply toothed. Near *D. Liboschitzianus,* Seringe, of the Caucasus, but differs in the toothed petals.

6? **D. deltoides,** *L.;* glabrous, leaves linear acute obscurely serrulate, bracts 2, calyx ⅓ in., petals toothed.

WESTERN TIBET; *Lance.*—DISTRIB. (of *D. deltoides,* Western Europe).

Specimens very imperfect, but apparently identical with the European plant, which varies from glabrous to pubescent, and very much in the length of the bracts, which in Lance's specimen are ½–⅔ the length of the calyx, and coloured.

†† *Surface of petals bearded or pubescent.*

7. **D. Seguieri,** *Vill.; Boiss. Fl. Orient.* i. 504; leaves broad, flowers usually fascicled, bracts 4–6 $\frac{1}{2}$–$\frac{2}{3}$ the length of the calyx, with leafy points.

Western Tibet, Ladak, *Stewart.*—Distrib. Siberia, Caucasus, Greece.

Stem 6–10 in., leafy, erect, simple or paniculately branched. *Leaves* strict, linear, obscurely 5-nerved. *Flowers* usually surrounded with leafy bracts below the 4–6 ovate abruptly cuspidate ones, which are themselves often tipped with an herbaceous point. *Calyx teeth* mucronate. *Petals* rosy, blade obovate acutely toothed.

** Petals fimbriate.

8. **D. fimbriatus,** *Bieberst.; Boiss. Fl. Orient.* i. 495; rigid, leaves rather broad subacute obscurely serrulate, bracts 6–8 short broad-ovate acute, calyx $\frac{3}{4}$–1 in., petals fimbriate for $\frac{1}{3}$ the length of the blade.

Western Tibet; *Falconer.*—Distrib. N. Persia, Caucasus.

Stock stout, woody, often elongate, much branched and suffruticose; stems many, strict, erect, 6–10 in., 1-flowered. *Leaves* $\frac{3}{4}$–1$\frac{1}{2}$ in., rigid, erect. *Bracts* $\frac{1}{4}$ the length of the calyx, sometimes cuspidate. *Calyx-teeth* long, lanceolate, pungent. *Petals* white, fading into lilac or pink.

9. **D. angulatus,** *Royle Ill.* 79; rigid, leaves linear acute serrulate, bracts 4–6 ovate acuminate or the lower cuspidate, calyx $\frac{1}{2}$–$\frac{2}{3}$ in., petals fimbriate for $\frac{1}{3}$ the length of the blade.

Western Himalaya, from Kunawar to Kishtwar, and in Piti and Zanskar, alt. 7–13,000 ft.

Quite similar to *D. fimbriatus*, and probably a variety of that plant, with the bracts often coloured and varying exceedingly in length, from $\frac{1}{4}$–$\frac{1}{2}$ the length of the calyx, which rarely exceeds $\frac{1}{2}$, and never $\frac{2}{3}$ of an inch.

Var. 1. bracts rather lax ovate suddenly cuspidate.

Var. 2. bracts with a foliaceous point $\frac{1}{2}$–$\frac{2}{3}$ the length of the calyx, leaves dark green, cauline 3 in., petals less deeply cut. Habit of *D. deltoides.*—Kishtwar.

Var. 3. *incertus*, Jacquem. Herb. (sp.); bracts 4 rarely 6 lax ovate acuminate $\frac{1}{3}$–$\frac{1}{2}$ the length of the calyx, petals not so deeply cut.—Kunawar.

10. **D. crinitus,** *Smith; Boiss. Fl. Orient.* i. 496; bracts 4–8 lanceolate long-acuminate, calyx 1–1$\frac{1}{4}$ in., teeth long lanceolate, petals fimbriate nearly to the base of the blade.

Western Punjab; Salt Range, *Fleming*, &c.; Peshawur, *Vicary*, &c. Western Tibet, *Falconer.*—Distrib. Beluchistan, Turkestan, and westward to the Levant.

Suffruticose below; branches rigid, 8–18 in., few flowered. *Leaves* rigid, acute, cauline usually shorter than the joints. *Bracts* $\frac{1}{3}$–$\frac{1}{2}$ the length of the calyx, acute or cuspidate. *Petals* white, sweet-scented, segments capillary.

D. barbatus, Linn., is enumerated by Royle, together with *D. caucasicus*, Sims, but both are unknown to us as Indian plants.

2. **TUNICA,** Scopoli.

Annual or perennial slender herbs. *Calyx* tubular, 5- (15-) toothed, with or without imbricate bracts. *Petals* 5, clawed, gradually widening into the entire or emarginate limb. *Stamens* 10. *Torus* small. *Ovary* 1-celled; styles 2; ovules numerous. *Capsule* oblong, dehiscing by 4 teeth, many-seeded. *Seeds* discoid or orbicular, peltate; embryo straight.—Distrib. About 10 species, chiefly South European and West Asiatic.

1. **T. stricta,** *Bunge; Boiss. Fl. Orient.* i. 521; annual, erect, leaves linear-spathulate, margins scabrous, cauline linear, flowers subsolitary ebracteate, calyx 5-ribbed. *Ledeb. Ic. Fl. Ross.* t. 5.

KASHMIR, *Falconer*, &c.—DISTRIB. Soongaria, Altai, Persia, Asia Minor.

Glabrous, 12–18 in., branched from the base. *Radical leaves* ¼–½ in., many, short. *Cymes* strict, and their branches slender quite erect. *Flowers* ⅙ in. long; pedicels often exceeding the glabrous turbinate calyx. *Petals* white, linear-oblong, entire. *Seeds* boat-shaped, wrinkled on the edges and keel.

3. ACANTHOPHYLLUM, C. A. Meyer.

Perennial, densely tufted acerose or spiny-leaved herbs or shrubs. *Flowers* solitary or in panicled or fascicled cymes, the lateral or all with 2–6 bracts. *Calyx* tubular or turbinate, 5-toothed or lobed, 5–15-nerved. *Petals* 5, exserted, narrow, spathulate; claw long, widening into the entire or notched limb. *Stamens* 10. *Disk* short or produced into a short gynophore. *Ovary* 1-celled, 4–10-ovuled; styles 2. *Capsule* ovoid or oblong, indehiscent or with 4 small teeth, 1–2-seeded. *Seeds* subreniform, laterally compressed, hilum marginal; embryo annular.—DISTRIB. About 17 species; natives of Western and Central Asia, most numerous in Affghanistan.

1. **A. macrodon,** *Edgew.;* hoary, leaves spinous, flowers solitary, bracts 4 linear with scarious margins.

Wazaristan in the PUNJAB, *Stewart.*—DISTRIB. Affghanistan, *Griffith.*

A tufted excessively spinous herb, minutely pubescent. *Leaves* horizontal, ½–¾ in., rigid with acerose tips, pale green, flat above, convex on the back, $\frac{1}{18}$–$\frac{1}{20}$ in. diam. at the base. *Flowers* rosy, ¾ in. long, terminal; bracts squarrose, pungent, recurved, reaching as high as the calyx-lobes. *Calyx* cylindric, hoary, lobes subulate-lanceolate, recurved, acerose, with very narrow scarious edges. *Petals* narrow.

4. GYPSOPHILA, Linn.

Perennial or annual, often glaucous herbs, rarely shrubby. *Leaves* usually flat, very rarely subulate. *Flowers* in panicled cymes, rarely solitary in the forks. *Calyx* turbinate tubular or campanulate, 5-toothed or -lobed, with 5 broad green nerves and membranous interspaces. *Petals* 5, claw narrow; limb entire or notched, without (rarely with) a scale. *Disk* small. *Ovary* 1-celled; styles 2 (rarely 3); ovules many. *Capsule* 4-valved to or below the middle, few- or many-seeded. *Seeds* subreniform, hilum lateral; embryo annular.—DISTRIB. Species about 50, European and W. Asiatic.

SECT. I. **Pseudacanthophyllum.** Undershrubs. *Leaves* pungent or acerose. *Calyx* ovoid or oblong-campanulate.

1. **G. Ptewartii,** *Thoms.;* puberulous, leaves ¼ in. subulate acerose, convex beneath, flowers subcapitate, bracts equalling the calyx-tube.

Wazaristan in the PUNJAB, alt. 3–4000 ft., *Stewart.*—DISTRIB. Affghanistan (Turuak valley).

A small green densely tufted spinous perennial. *Leaves* spreading, flat above, points glabrous polished. *Cymes* on short peduncles, 8–15-flowered; bracts narrow-subulate. *Calyx* ⅙ in., ovoid, glabrous, 5-ribbed; teeth long, slender, subulate. *Petals* half as long again as the calyx; blade pink, linear-oblong.—Closely allied to *G. erinacea*, Boiss. (of Affghanistan), but much smaller, with crowded flowers, and glabrous calyces with longer subulate teeth.

Sect. II. **Heterochroa.** Herbs. *Leaves* flat. *Calyx* campanulate 5-fid.

2. **G. sedifolia,** *Kurz. in Flora*, 1872, 285; perennial, tufted, hoary all over, leaves linear obtuse, cymes capitate. G. Tibetica, *H. f. & T. Herb. Ind. Or.*

Western Tibet, Zanskar and Dras, alt. 9–13,000 ft., *Thomson.*

Root very stout, woody, with very many short tufted pointed decumbent branches. *Stems* pale. *Leaves* fascicled, $\frac{1}{4}$ in., nerveless, rather thick, pruinose. Heads of cymes $\frac{1}{6}$–$\frac{1}{4}$ in., on elongated branches 1–3 in. diam.; bracts linear, obtuse. *Calyx* $\frac{1}{12}$ in., 5-lobed, teeth obtuse, margins scarious: *Capsule* not exceeding the calyx. *Seeds* cochleate.

3. **G. cerastioides,** *Don Prodr.* 213; perennial, hoary-pubescent, branches many decumbent, leaves obovate-spathulate, cymes lax. Acosmia rupestris, *Benth. in Wall. Cat.* 644; *Camb. in Jacq. Voy. Bot.* 26, t. 28. Timæosia rupestris, *Klotzsch in Bot. Reis. Pr. Waldem.* 138, t. 33 (*styles* 3).

Temperate Himalaya from Kashmir and Kunawar to Sikkim, alt. 6–12,000 ft.

Very variable in size; branches 4–10 in. *Leaves* $\frac{1}{2}$–2 by $\frac{1}{4}$–$\frac{3}{4}$ in., radical petioled, cauline sessile, all ciliate. *Cymes* usually lax, with leafy bracts. *Flowers* sessile or pedicelled, very variable in size, $\frac{1}{6}$–$\frac{1}{2}$ in. diam. *Calyx* $\frac{1}{4}$ in., campanulate, pubescent; lobes obtuse, strongly ciliate with curved hairs. *Petals* lilac, spathulate, 3-nerved. *Styles* 2–3. *Seeds* broad, black, tubercled.

5. **SAPONARIA,** Linn.

Annual or perennial herbs. *Leaves* flat. *Flowers* in dichotomous cymes. *Calyx* more or less tubular, ovoid or oblong, 5-toothed, nerves obscure. *Petals* 5, clawed; limb entire or notched, with or without a basal scale. *Stamens* 10. *Disk* small, or produced into a gynophore. *Ovary* 1-celled, or imperfectly 2–3-celled; styles 2, rarely 3; ovules many. *Capsule* ovoid or oblong, rarely subglobose, 4-toothed. *Seeds* reniform or subglobose, hilum marginal; embryo annular.—Distrib. Species about 30, chiefly Mediterranean and W. Asiatic.

1. **S. Vaccaria,** *Linn.*; radical leaves oblong, cauline sessile, base rounded or cordate, calyx-teeth triangular margins scarious, petals short erose. *Wall. Cat.* 1503. S. Vaccaria *and* oxyodonta, *Boiss. Fl. Orient.* i. 525. S. perfoliata, *Roxb. Fl. Ind.* ii. 445. Gypsophila Vaccaria, *W. & A. Prodr.* 42.

In wheatfields throughout India, and in Tibet.—Distrib. A weed of cultivation.

A tall, robust, simple or sparingly branched perfectly glabrous annual, 12–24 in. high. *Leaves* 1–3 by $\frac{1}{3}$–$\frac{3}{4}$ in., acute, cauline linear-oblong. *Cymes* corymbose, many-flowered. *Flowers* erect; pedicels slender. *Calyx* $\frac{1}{2}$ in., with 5 broad green nerves, ventricose in fruit. *Petals* rosy, obovate. *Capsule* included, broadly ovoid. *Seeds* large, globose, black, granulate.

6. **SILENE,** Linn.

Annual or perennial herbs. *Flowers* solitary or cymose, often secund on the branches of the cyme. *Calyx* more or less inflated, ovoid campanulate clavate or tubular, 5-toothed or cleft, 10- rarely many-nerved. *Petals* 5; claw narrow; limb entire bifid or laciniate, usually with two basal scales. *Stamens* 10, 5 usually adnate to the petals. *Disk* usually produced into a long gynophore. *Ovary* incompletely 3- (rarely 1-) celled; styles 3 (rarely 5); ovules numerous. *Capsule* 3–6-toothed or valved. *Seeds* reniform, usually tubercled, hilium marginal; embryo annular.—Distrib. Species about 250, chiefly natives of temperate Europe and Asia.

The following escapes from cultivation occur in Indian collections.

S. Armeria, L. in the Nilgherries and Canara (Plant. Hohenack. No. 615).—*S. noctiflora*, L. (Wall. Cat. 624, from Herb. Wight., without habitat).—*S. colorata*, Poiret; (*S. intrusa*, W. & A. Prodr. 42; Wight Ill. i. t. 26); Nilghiris and Garwhal.

SUBGEN. I. **Behen.** *Petals* imbricate in bud. *Calyx* usually inflated, 10- or 20-nerved, reticulately veined.

1. **S. inflata,** *Smith;* glaucous, cymes many-flowered, bracts scarious, calyx 20-nerved, petals deeply cloven. *Wall. Cat.* 623; *Boiss. Fl. Orient.* i. 628. S. Wallichiana, *Klotzsch in Bot. Reis. Pr. Waldem.* 139, t. 30. S. Cucubalus, *Wib. in Rohrb. Monog. Silene*, 84. Cucubalus Behen, *Linn.*

TEMPERATE HIMALAYA, elev. 5–11,500 ft., from Nipal to the Indus.—DISTRIB. Temperate Asia, Europe, and N. Africa.

Perennial, 2–5 ft., erect or ascending, glabrous or pubescent. *Leaves* 1–3 in., ovate obovate or oblong, cauline sessile; margins denticulate. *Flower* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., drooping white. *Calyx* ovoid, base intruded, teeth broadly triangular. *Petals* white, with two gibbosities in the place of scales. *Capsule* globose, gynophore short. *Seeds* concave in front, convex on the base, tubercled in lines.

SUBGEN. II. **Silene proper.** *Petals* contorted in æstivation. *Calyx* with 10 anastomosing nerves, or 20, 30, or 60 simple nerves, not reticulately veined.

SECT. I. **Conosilene.** *Calyx* 20-, 30-, or 60-nerved, in fruit conical from a broad base.—Annuals.

2. **S. conoidea,** *Linn.*; glandular-pubescent, cauline leaves oblong or lanceolate acute, flowers panicled, calyx-base intruded, teeth subulate-lanceolate, $\frac{1}{3}$ its length, petals obovate, capsules ovoid contracted above sessile. *Boiss. Fl. Orient.* i. 580; *Wall. Cat.* 625.

WESTERN HIMALAYA; from Kumaon to the Indus, alt. 1–8000 ft.; and from OUDE to the PANJAB, in the plains. WEST TIBET; Ladak, alt. 8–11,000 ft.—DISTRIB. Westward to the Atlantic ocean.

Erect, 6–18 in., dichotomously branched. *Leaves* 2–4 in., radical spathulate, cauline sometimes very narrow, sessile. *Calyx* 1 in. inflated in fruit. *Petals* pink, small, entire or erose; claw auricled; scales 2. *Capsule* crustaceous, shining. *Seeds* cochleate, with 5 dorsal and as many lateral rows of tubercles.

SECT. II. **Scorpioideæ.** *Calyx* 10-nerved.—Annuals (the Indian species). *Flowers* in unilateral racemes.

3.* **S. gallica,** *Linn.;* annual, laxly pilose, glandular above, cauline leaves linear-oblong or spathulate, cyme simple, flowers unilateral, calyx-base rounded, teeth subulate-lanceolate $\frac{1}{6}$ its length, capsule subsessile ovoid. *Boiss. Fl. Orient.* i. 590.

GARWHAL, *Falconer;* CARNATIC, *Wight:*—an introduced weed.—DISTRIB. A weed of cultivation.

Erect, 8–18 in., clothed especially above with spreading hairs. *Leaves* $\frac{3}{4}$–$1\frac{1}{2}$ in. *Racemes* many-flowered. *Flowers* $\frac{1}{3}$–$\frac{1}{2}$ in. long, secund, lower pedicelled, upper sessile. *Calyx* ovoid, 10-striate, contracted above. *Petals* small, red (or white), emarginate; scales 2. *Filaments* villous below. *Seeds* minute, striate-tuberculate, not grooved, face flat with an ear-shaped depression.

3. **S. apetala,** *Willd. Sp. Pl.* ii. 307; annual, hoary-pubescent, cauline leaves linear-oblong, flowers subracemose, calyx campanulate, base obconic, teeth short lanceolate acute, margins scarious, petals included, capsule globose, shortly stipitate. *Boiss. Fl. Orient.* i. 596.

PANJAB; Peshawur, *Vicary*, *Stewart*.—DISTRIB. Westwards to Spain.

Stem 6–24 in., simple or branched. *Leaves* 1–1½ in., acuminate, ciliolate. *Cymes* irregular, loosely racemose; peduncles exceeding the calyx; bracts acute. *Calyx* ¼–⅓ in., with broad green hairy nerves; teeth short. *Petals* 0, or minute, spathulate, bright red. *Seeds* flat, channelled, with a double corrugated margin.

SECT. III. **Auricularia.** *Calyx* 10-nerved, contracted towards the base. *Petals* with the claw toothed or auricled on both sides.—Perennials. Flowers solitary or in few-flowered elongate panicled cymes.

4. **S. Moorcroftiana,** *Wall. Cat.* 626; perennial, finely pubescent, cauline leaves linear or linear-lanceolate, flowers 1–3 terminal or subterminal, calyx tubular-clavate viscid, base intruded, teeth short obtuse with scarious margins, capsule ovoid shorter than the gynophore. *Benth. in Royle Ill.* 79; *Rohrb. Monog. Silene*, 129.

WESTERN HIMALAYA, alt. 10–13,000 ft.; from Garwhal to Kashmir. WESTERN TIBET, alt. 9–16,000 ft.—DISTRIB. Affghanistan.

Stems many from a woody stock, densely tufted; flowering branches erect, 6–18 in., slender, simple or dichotomous at the top. *Radical leaves* spathulate-lanceolate, acute; cauline shorter, acuminate acute or obtuse. *Flowers* erect. *Calyx* 1–1¼ in., slender below the middle; nerves 10, dark. *Petals* exserted, claw auricled with a long acute tooth; limb 2-partite, segments ligulate, dirty red or white, involute when withering; scales 2, long. *Capsule* with the gynophore as long as itself. *Seeds* compressed, not channelled, with 5 rows of dorsal and as many lateral tubercles.

VAR. 1. taller, more slender, 2–3-flowered.—Tibet.

VAR. 2. dwarf, leaves linear, pedicels longer than the bracts.

5. **S. arenosa,** *C. Koch. in Linnæa*, xv. 711; annual, slender, glaucous, viscid above, leaves narrow, margins revolute, flowers in sparse much-divaricating cymes, calyx clavate, base intruded, teeth lanceolate-ciliate, capsule oblong equalling the gynophore. S. leyseroides *and* S. salsa, *Boiss. Fl. Orient.* i. 603.

WESTERN PANJAB, common at Peshawur, Attock, &c. *Vicary*, *Stewart*.—DISTRIB. Affghanistan, Persia, Armenia.

Very slender, excessively branched from the base, minutely pubescent, glandular above. *Leaves* shorter than the internodes, ¾–1½ in., rigid, acuminate. *Flowers* erect or inclined; pedicels ½–1 in., capillary. *Calyx* ½–⅔ in., slender, 10-ribbed; teeth with scarious margins. *Petals* with an oblong 2-fid blade, lobes linear, claw auricled; scales 2, small, lanceolate.—Flowers open at night.

6. **S. tenuis,** *Willd.*; perennial, glabrous or viscid, leaves narrow linear or lanceolate, flowers in short racemes, calyx campanulate, base rounded or truncate, teeth obtuse, petals 2-partite auricled, capsule oblong, gynophore short. *Rohrb. Monog. Silene*, 186. S. graminifolia, *Otth. in DC. Prodr.* i. 368, *not of Ledeb.* S. Gul.-Waldemarii, *Klotzsch Bot. Reis. Pr. Waldem.* 140, t. 31. S. repens, *Boiss. Fl. Orient.* i. 614 (? of Patrin): *Ledeb. Ic. Fl. Ross.* t. 425. S. amæna, *Linn. Sp. Pl. ed.* 1 (*not of ed.* 2).

WESTERN HIMALAYA, alt. 8–12,000 ft., from Kunawar to Kashmir, *Jacquemont*. WESTERN TIBET, *Falconer*.—DISTRIB. Northern and Arctic Asia.

Stems many from the root, erect or ascending, 4–18 in., slender, simple, naked when tall. *Leaves* 1–3 in., acute or acuminate, often ciliate, flat, radical slightly dilated upwards. *Flowers* often whorled, sometimes secund, inclined or nodding; pedicels ⅙–¼ in.; bracts short, whorled, subulate. *Calyx* ⅓–½ in., membranous, 10-nerved; teeth spreading. *Petals* dirty-yellow or brown; scales short, oblong; claw ciliate. *Capsule* twice the length of the gynophore. *Seeds* with 5 dorsal and as many lateral rows of tubercles.

VAR. *dasyphylla*, Turcz. Fl. Baic. Dah. i. 207 (sp.), densely pubescent, leaves more coriaceous not ciliate. Lahul, *Jæschke*.

SECT. IV. **Otites.** *Calyx* 10-nerved, cylindric or contracted towards the base. *Petals* not auricled at the sides, with or without scales at the top of the claw.—Perennials. Flowers in opposite panicled or racemed cymes.

7. **S. Falconeriana,** *Benth. in Royle Ill.* 79, t. 20; perennial, stout, erect, pubescent below, leaves linear-lanceolate serrulate-ciliate, flowers in short uniform opposite cymes, calyx cylindric narrow, base intruded, teeth short obtuse, petals very narrow spathulate, tip rounded or notched, capsule ovoid longer than the gynophore. *Rohrb. Monog. Silene*, 202.

WESTERN HIMALAYA, from Kumaon to Kunawar, alt. 3–9000 feet, *Royle*, &c.

Stems 1–2 ft., several from the woody stalk, simple or branched, closely pubescent below. *Leaves* 1½–2½ in., narrow, pubescent or glabrous on both surfaces. *Inflorescence* 1–1½ ft. long, lax, of opposite or whorled cymes or branched racemes. *Flowers* erect or inclined; pedicels slender; bracts minute. *Calyx* ½ in., slightly dilated upwards in flower, much so in fruit, membranous, nerves 10, green; teeth not margined with white; base truncate. *Petals* white, without scales or auricles. *Capsules* ovoid, twice or thrice the length of the gynophore. *Seeds* minute, granulate, sides flat or convex, back channelled.

8. **S. Griffithii,** *Boiss. Fl. Orient.* i. 637; perennial, robust, densely pubescent, tomentose or villous, leaves oblong or ovate-lanceolate, radical petioled, flowers in opposite few-flowered cymes, calyx cylindric, teeth acute, base rounded or truncate, petals 2-partite, lobes 3–6-fid, scales 0, capsule oblong, gynophore short. S. Webbiana, *Wall. Cat.* 627. S. multifida, *Edgew. in Trans. Linn. Soc.* xx. 34. Carpophora Hoffmeisteri, *Klotzsch in Bot. Reise Pr. Wald.* 139, t. 32. S. viscosa, *Pers.; Benth. in Royle Ill.* 79. Melandryum Griffithii, *Rohrb. in Linnæa*, xxxvi. 248; *Monog. Silene*, 232. S. viscosa lusus 3, *and* β suaveolens, *Kar. & Kir. (sp.), Rohrb. Monog. Silene*, 205.

WESTERN HIMALAYA, from Garwhal to Cabul and Kishtwar, alt. 7–11,000 ft.—DISTRIB. Affghanistan, Soongaria.

Very variable in pubescence, from hoary to almost woolly. *Stems* 12–18 in., simple or divided, very robust. *Leaves* 2½–4 by ¾–1¼ in., radical spathulate-lanceolate, narrowed into a broad petiole; cauline sessile, sometimes cordate at the base, more or less pubescent on both surfaces. *Flowers* in opposite irregularly 3-flowered cymes, shortly pedicelled. *Calyx* ¾–1 in., glandular, hardly dilated above except in fruit, teeth not margined with white, nerves 10, green. *Petals* more or less laciniate, without scales or auricles. *Petals* white. *Capsule* four times as long as the gynophore. *Seeds* immature, apparently like those of *S. Falconeriana.*—Very closely allied to *S. viscosa*, L., with which it is united by Bentham and Rohrbach.

9. **S. kunawarensis,** *Benth. in Royle Ill.* 79; perennial, puberulous or quite glabrous, slender, leaves narrow-spathulate or lanceolate, flowers in opposite distant pairs or cymes, pedicels slender, calyx glabrous cylindric or subclavate, base intruded, teeth short obtuse with scarious margins, petals deeply 2-fid, scales oblong, capsule ovoid twice as long as the gynophore.

WESTERN HIMALAYA, in the Tibetan regions of Kunawar and Piti, alt. 10,000 ft., *Royle, Jacquemont*, &c.

Branches tufted from a prostrate stock; flowering ones slender, 6–12 in., usually glabrous above. *Leaves* 1–1½ in., very narrow, minutely pubescent on both surfaces. *Flowers* rather few and scattered, nodding, pedicels slender, equalling the calyx. *Calyx* ⅓–½ in., membranous, quite glabrous or the teeth pubescent, clavate in fruit, 10-nerved. *Petals* with 2 linear-oblong scales and no auricles. *Capsule* pale. *Seeds* dorsally channelled, sides nearly flat, hardly tubercled.

10. **S. Webbiana,** *Wall. Cat.* 627; tall, slender, minutely pubescent, cauline leaves broadly ovate-cordate amplexicaul acuminate 5–9-nerved,

cymes lax opposite long-peduncled, calyx glandular cylindric, teeth lanceolate-subulate, base truncate intruded, capsule narrow oblong, rather longer than the gynophore. S. viridiflora, *var. Rohrb. Monog. Silene*, 215.

Western Himalaya, Sirmur, *Webb.*

We have seen but one specimen, itself a fragment, 16 in. tall, of what is evidently a tall spare lax-flowered species of a plant resembling closely *S. viridiflora*, Linn.—*Leaves* 1½ in. broad, puberulous on both surfaces. Branches of panicle (peduncles of cymes) 3–6 in., terminated by two ovate foliaceous bracts *Flowers* drooping; pedicels ½–¾ in., densely tomentose. *Calyx* ¾ in., very slender, 10 nerved, ventricose in fruit; teeth with scarious edges. *Petals* long, greenish-white; limb bifid, lobes ligulate; scales 2. *Filaments* glabrous. *Ovary* cylindric, top globose; styles 3. *Capsule* immature, cylindric-oblong.

Sect. V. **Cucubaloideæ.** *Calyx* cylindric, rounded at the base, pale, membranous. *Petals* without auricles at the sides.—Scandent or subscandent slender lax perennials. *Flowers* in very lax few-flowered panicled cymes.

11. **S.? Stracheyi,** *Edgew.*; glabrous, flaccid, subscandent, leaves petioled lanceolate acuminate membranous, cymes 3-flowered bracteate, calyx membranous, teeth broad with orbicular tips, capsule half the length of the gynophore.

Temperate Himalaya, Piti river, Kumaon, alt. 7 500 ft., *Strach. & Winterb.* Sikkim in woods, Lachen river, alt. 9–10,000 ft., *J. D. H.*

Habit and foliage of *Cucubalus baccifer*, but glabrous or nearly so, leaves longer petioled. Calyx cylindric, and ovary with a very long gynophore and 5-lobed callous tip, indicating a 5-valved dehiscence.—*Stems* shining. *Leaves* 2–2½ by ½–¾ in., ciliolate, with an intramarginal nerve. *Pedicels* ½–1 in., very slender, minutely pubescent. *Calyx* ⅔ in., pale, with 10 green nerves and anastomosing veins between them above; teeth hyaline, contracted below the orbicular ciliolate tips *Petals* white, very narrow; claw not auricled; limb retuse or 2-lobed. *Filaments* glabrous; anthers short, didymous.—An exceedingly curious plant, intermediate between *Silene* and *Cucubalus*, perhaps better referred to the latter genus.

12. **S. khasiana,** *Rohrb. in Linnæa*, xxxvi. 259; glandular pubescent above, subscandent, leaves sessile ovate acuminate, flowers solitary and in terminal 2–3-flowered bracteate cymes, calyx shortly cylindric, teeth broad acute, base rounded, capsule oblong, gynophore very short.

Khasia Mts., at Molim and Moflong, alt. 5–6000 ft., *H. f. & T.*

A straggling brittle hardly flaccid herb, with rather robust branches. *Leaves* 1–2 in., not membranous, 3–5-nerved at the base, paler beneath, glabrous or sparsely pubescent, ciliolate. *Flowers* erect; pedicels ½–1 in., strict. *Calyx* ⅓ in., with 10 broad nerves and no veins. *Petals* pale pink; claw cuneate; limb 2-partite, obtuse; scales small. *Filaments* glabrous; anthers didymous. *Capsule* broad, with very small teeth. *Seeds* dorsally rounded, sides convex striate-tuberculate.

7. CUCUBALUS, Linn.

A diffuse subscandent herb. *Leaves* ovate-lanceolate. *Flowers* in 1–3-flowered leafy cymes or solitary in the forks of the branches. *Calyx* broadly campanulate, 10-nerved, 5-toothed. *Petals* 5; claw narrow toothed at the top; limb 2-fid with 2 scales at its base. *Stamens* 10. *Disk* produced into a short gynophore. *Ovary* 1-celled, 3-septate at the base; styles 3; ovules many. *Fruit* globose, tip crowned with an entire callus, shining, dry or fleshy, at length fragile and bursting irregularly. *Seeds* reniform, shining; hilum lateral; embryo annular.

1. **C. bacciferus,** *Linn.*; *Boiss. Fl. Orient.* i. 657.

TEMPERATE HIMALAYA, from Kashmir, alt. 5–8000 ft. to Sikkim, alt. 8–12,000 ft. KHASIA MTS., at the Boga Pani, alt. 5000 ft., *H. f. & T.*—DISTRIB. Westwards to South Europe; W. Siberia.

A rambling herb, more or less pubescent with curly white hairs. *Leaves* 1–2 by ¾–1 in., membranous, ciliate, narrowed into the petiole, upper sessile. *Flowers* drooping; pedicel ⅙–½ in., tomentose. *Calyx* ⅓ in., base rounded; teeth large, broad, subacute, ciliolate; nerves obscure, veins reticulate. *Petals* greenish-white, 2-lobed. *Anthers* didymous. *Fruit* the size of a pea, black.

8. **LYCHNIS,** Linn.

Herbs, with the habit of *Silene*, but capsule 1-celled, and styles usually 5 (3–5).—DISTRIB. Species about 30, natives of Arctic and Temperate northern regions, and of the Andes of S. America.

The following species of *Lychnis* are, with the exception of *L. Coronaria*, extremely difficult to limit, the characters of habit, nervation of the calyx, form and division of the petals, and superficial markings of the seed, being all very variable. The division into winged- and wingless seeded is far from good; the contrast between the reniform granulate, and the angled and winged seeds, is indeed strong, but analogy with other genera would suggest, that some of the wingless species are but forms of winged ones. We cannot follow Rohrbach and others in separating *Melandryum* from *Lychnis* proper; the capsule dehiscing variously in the same species, and several true *Melandrya* having crested seeds.

SECT. I. **Pseudagrostemma.** *Petals* with stiff 2-toothed scales at the claw. *Capsule* 5-valved, valves quite entire.

1. **L. Coronaria,** *Lamk.*; uniformly softly tomentose with silky white wool. *Boiss. Fl. Orient.* i. 658.

KASHMIR VALLEY, abundant in groves and fields, *Jacquemont*, &c.—DISTRIB. W. Asia, S. Europe.

Stem 1–2 ft., sparingly branched. *Leaves* 3–5 in., spathulate-lanceolate, cauline oblong. *Flowers* on long pedicels. *Calyx* ¾–1 in., turbinate, 10-nerved; teeth contorted to the left. *Petals* 1 in. and upwards, broadly obcordate, red purple. *Capsule* subsessile, included. *Seeds* biconvex, equally striate-tuberculate.

SECT. II. **Melandryum.** *Petals* with membranous scales. *Capsule* 4–5-valved, valves entire or 2-fid.

* Stem scape-like, 1- rarely 2–3-flowered. Seeds compressed or angled, winged, not granulate or tubercled; wing thick or inflated.

2. **L. apetala,** *Linn.*; stem short glandular-pubescent 1- rarely 2–3-flowered, calyx inflated subglobose with broad purple-brown nerves, petals with a very short emarginate or bifid limb, carpophore very short or 0. Melandryum apetalum, *Rohrb. in Linnæa,* xxxvi. 217. M. Falconeri, *Rohrb. l.c.* 220.

ALPINE HIMALAYA and TIBET, alt. 12–17,000 ft.; and to 18,000 ft. in Sikkim.—DISTRIB. Arctic regions, mountains of N. Europe, Asia, and America.

Stems tufted, 2–6 in., often curved. *Leaves* radical linear-lanceolate or spathulate, obtuse or acute; cauline 1–2 pair. *Flowers* nodding. *Calyx* ½–⅔ in. long, mouth contracted, more open in fruit, membranous, pale between the broad dark nerves, which are variable in disposition, simple or sparingly branched, the secondary free or uniting with the primary in the short broad calyx-teeth. *Petals* excessively variable in length and breadth and in the subentire crenate or lobed scales, purplish. *Capsule* turgid; valves bifid, erect or recurved; carpophore glabrous or tomentose, always very short. *Seeds* very variable, $\frac{1}{18}$–$\frac{1}{13}$ in. diam., with a narrow or broad wing.—I cannot distinguish *L. Falconeri*, Rohr., even as a permanent variety; it is characterized as having a more open calyx in fruit.

VAR. *pallida*, stems usually 2-flowered, calyx very pale with green undefined veins.—Western Tibet, *Falconer*, *Henderson*.

3. **L. nigrescens,** *Edgew.*; stem simple glandular-pubescent 1-flowered, calyx inflated subglobose with broad purple-brown nerves, petals with a short retuse limb, carpophore $\frac{1}{6}$–$\frac{1}{4}$ the length of the capsule brown-tomentose. L. tristis, *Herb. Ind. Or. H. f. & T.* Melandryum macrorhizum, *Rohrb. in Linnæa*, xxxvi. 228, *not of Royle.*

ALPINE SIKKIM HIMALAYA, alt. 11–16,000 ft., *J. D. H.*

Similar in many respects to *L. apetala*, but stem more leafy, calyx larger and more inflated, almost $\frac{2}{3}$ in. diam., with broader more membranous-edged teeth, and a very different carpophore. The nerves of the calyx are simple and free in all the specimens, and the seeds are like those of the rather narrow-winged forms of *L. apetala.*—Rohrbach is certainly in error in describing this as wingless-seeded, and in referring it to Royle's *L. macrorhiza.*

4. **L. himalayensis,** *Edgew.*; stem very slender elongate 1–3-flowered minutely pubescent, leaves usually very slender, calyx broadly oblong with slender black-purple nerves, petals with a very small blade, carpophore very short pubescent or 0, seeds angular very small narrowly-winged. L. apetala, *var.* himalayensis, *Rohrb. in Linnæa*, xxxvi. 22. L. apetala, *var.* gracilis, *Herb. Ind. Or. H. f. & T.*

SIKKIM HIMALAYA, alt. 11–14,000 ft., *J. D. H.* WESTERN TIBET, *Falconer*; Sassar, alt. 15–17,000 ft., *T. T.*

Probably only a slender form of *L. apetala*, but easily distinguished by its size (8–16 in.), slenderness, long narrow leaves, narrower smaller calyx $\frac{1}{3}$–$\frac{1}{2}$ in. long, with usually more slender and free veins, which however sometimes unite in the teeth, and small seeds which are pale in Thomson's specimens, black in Hooker's and Falconer's.

** Seeds turgid, reniform, wingless, granulate tubercled or echinulate.

† *Stem short, single- rarely 2-flowered.*

5. **L. macrorhiza,** *Royle*; *Benth. in Royle Ill.* 80 (*not of Rohrb.*); stem short simple 1-flowered and leaves closely glandular-pubescent, leaves obovate-spathulate, calyx broadly oblong inflated pale, nerves faint free or united in the calyx-teeth, petals short, carpophore stout brown-tomentose. L. madens, *Jacq. mss.*

ALPINE WESTERN HIMALAYA, and WESTERN TIBET; Kunawar, *Royle*, *Jacquemont*; Parang Pass, alt. 15–16,000 ft., *T. T.*; Topi dhunga, alt. 15,000 ft., *Strach. & Winterb.*

Whole plant 4–6 in., resembling *L. apetala*, but leaves broader and more densely pubescent, pale, obtuse or subacute. *Calyx* $\frac{1}{2}$–$\frac{3}{4}$ in. *Petals* apparently deep purple; limb short, 2-fid. *Seeds* pale chestnut, absolutely wingless, minutely granulate concentrically, back rounded.—Royle's specimens are very imperfect, but I think referable to this.

†† *Stem elongate, simple or branched; leaves narrow, linear-lanceolate (rarely ovate in* L. Cachemeriana).

6. **L. brachypetala,** *Hort. Berol.*; stem 1–2 ft. slender hoary simple few or many-flowered, leaves very narrow grass-like glabrous or minutely pubescent, flowers nodding opposite or in short few-flowered opposite cymes, calyx ovoid pale with 10 dark or green simple free or connected nerves, petals very short pale 2-partite, carpophore short glabrous or pubescent or 0, seeds

reniform dark granulate. Melandryum brachypetalum, *Fenzl in Led. Fl. Ross.* i. 326. *Var.* tibetanum, *Rohrb. in Linnæa,* xxxvi. 232.

ALPINE HIMALAYA; from Sikkim, alt. 12–15,000 ft., *J. D. H.*, to Kunawar, *Jacquemont;* and WESTERN TIBET, alt. 10–15,000 ft., *Str. & Winterb.*, *Thomson,* &c..—DISTRIB. Siberia, Dahuria, Mongolia.

Stems strict, very rarely divided except at the base. *Leaves* 2–5 in., rarely ¼ in. broad. *Flowers* often in distant pairs towards the top of the stem; pedicel strict, 2-bracteolate. *Calyx* ⅓ in. long, pale with dark or green nerves, which are very variable; teeth spreading in fruit. *Petals* pale-red or dirty white, included or slightly exserted; claw glabrous or ciliate, obtusely auricled. *Seeds* minute. *Capsule* with simple or 2-fid teeth.—The nerves of the calyx are sometimes united at the tips, at others free; at times simple, and again the secondaries branch and unite with the primaries.

7. **L. multicaulis,** *Wall. Cat.* 622; stems 2–3 ft. strict laxly pubescent above, leaves linear-lanceolate, glabrous or puberulous margins scaberulous, flowers very few in elongate racemes nodding, calyx oblong-campanulate, nerves green or brown united in the teeth, petals short, limb minute toothed, carpophore short pubescent or 0, seeds reniform dark granulate. *Benth. in Royle Ill.* 80. Melandryum multicaule, *Rohrb. in Linnæa,* xxxvi. 226.

TEMPERATE HIMALAYA; Nipal, *Wallich;* Kumaon, 10–12,000 ft., *Edgew.;* Sikkim, alt. 11,000 ft., *J. D. H.* (flower rather large, calyx green).

A much taller plant than *L. brachypetala,* inhabiting lower levels, with sparser inflorescence, longer pedicelled fewer flowers and usually broader leaves; but probably only a lowland form; also very near *L. nutans,* Royle. Wallich's and Edgeworth's specimens have calyces ⅓ in. long, with purple nerves; the Sikkim ones have larger calyces, ½ in. long, with broader green nerves; in both the venation is very variable. *Styles* 3–5 and capsule 5–6- or 8–10-cleft.

8. **L. Cachemeriana,** *Royle; Benth. in Royle Ill.* 80; stem robust erect strict simple hoary, leaves from ovate to lanceolate scaberulous, flowers large erect or nodding in subterminal contracted cymes, calyx green oblong, teeth acute, nerves many anastomosing, claw of petals woolly, limb 2-fid, lobes cut, carpophore broad densely woolly, seeds reniform granulate. Melandryum indicum, *var.* fimbriatum (a form), *Rohrb. in Linnæa,* xxxvi. 235.

KASHMIR, *Royle,* &c.

An erect rigid species, with strict rarely spreading cymes. *Leaves* very variable, 2–3 by ½–⅔ in. *Calyx* membranous, ¾–1 in. long, teeth acute or acuminate. *Petals* white or pale, blade about ⅓ in. long. *Carpophore* about ¼ as long as the 5-fid capsule. —Probably only a form of *L. indica,* as regarded by Rohrbach, but the calyx-lobes are usually much more acute.

9. **L. Stewartii,** *Edgew.;* stem short, wiry, hoary below pubescent above leafy, leaves very narrow linear spreading 1-nerved, flowers few small solitary in the upper leaf axils nodding, calyx oblong pubescent, nerves green faint free or united, teeth rounded, petals obcordate with a very short 2-partite white limb, carpophore densely woolly, styles 3 very short.

WESTERN HIMALAYA; Upper Chenab and Chamba river, alt. 8–11,000 ft., *Stewart.*

A very curious little species, probably polygamo-diœcious, of which there are but scanty specimens, without seed, somewhat resembling *Stellaria graminea* in foliage, and quite unlike any other Indian species of the genus. *Stem* 4–6 in., rigid, slender, upper part and pedicels viscidly tomentose. *Leaves* 2 by $\frac{1}{16}$–$\frac{1}{12}$ in., rigid, keeled by the solitary stout midrib, margins recurved. *Pedicels* solitary or in opposite pairs, pubescent, with two linear bracts above the middle. *Calyx* ⅓ in. long, membranous, pubescent, teeth scarious, edges with long curled cilia. *Petals* with the claw very broad, auricled, exceeding the calyx; limb small, recurved; appendages notched. *Capsule* exceeding the calyx, 10-cleft.

††† *Stem elongate, usually laxly dichotomously branched (simple in* L. inflata). *Leaves ovate elliptic or lanceolate.*

10. **L. inflata,** *Wall. Cat. n.* 618; minutely pubescent, stem simple erect 1–3-flowered leafy, leaves elliptic or lanceolate lower petioled, flowers large terminal drooping, calyx very inflated pale with dark brown nerves, teeth rounded, petals with a broad claw 2 large appendages and a short rounded limb, carpophore short woolly, seeds reniform compressed, back furnished with rows of long soft setæ. *Benth. in Royle Ill.* 80. Melandryum inflatum, *Rohrb. in Linnæa* xxxvi. 225. Agrostemma inflata, *Don Gen. Syst.* i. 417.

WESTERN TEMPERATE HIMALAYA; Kumaon, *Blinkworth.*

Stem rather stout, 10–16 in., glandular-pubescent above, nodes swollen. *Leaves* 1½–2½ by ⅔–¾ in., acute or acuminate. *Pedicels* slender, ebracteolare. *Calyx* ¾ in. long, nearly as broad, membranous; nerves free or uniting in or below the broad hyaline rounded teeth, which are not ciliate.—A very curious and distinct form, the seeds of which are quite peculiar. It is singular that it should have escaped the notice of all collectors in Kumaon since the days of Blinkworth, the first explorer of the Flora of that region.

11. **L. indica,** *Benth. in Royle Ill.* 81; finely-pubescent, stem leafy diffusely dichotomously branched, leaves elliptic or ovate-lanceolate or orbicular, panicle lax many-flowered, calyx oblong inflated, nerves green or brown, lobes short rounded, carpophore short broad pubescent, petals with a 2-fid or fimbriate limb, seeds reniform granulate.

TEMPERATE HIMALAYA, alt. 5500–10,000 ft., from Nipal to Marri.

A tall dichotomously branched spreading weak herb, 2–3 ft. high; stem below sometimes as thick as a swan's quill. *Leaves* variable, more or less ovate-lanceolate, lower petioled, largest 4 in. long, membranous, flaccid. *Flowers* drooping when young, in open or contracted panicled glandular-hairy cymes; pedicels ebracteate. *Calyx* ½–¾ in. long, glandular-pubescent; nerves 10–15, free or combined, simple or branched; teeth broad, obtuse rarely acute. *Petals* very variable, usually white inside and purplish outside; appendages short, obtuse, often crisped. *Capsule* ovoid, teeth 5, simple or bifid. *Seeds* minute, very dark, the granulations on the back stronger than on the sides.

VAR. 1. *indica proper;* petals with a short 2-fid blade, lobes entire or 2-toothed, styles usually 3. Silene indica, *Roxb. Hort. Beng.* 34; *Fl. Ind.* ii. 447; *Wall. Cat.* 264 *in part.* Melandryum indicum *var.* genuinum, *Rohrb. in Linnæa,* xxxvi. 234.

VAR. 2. *fimbriata,* Wall. Cat. 619 (Sp.); petals with a longer lacerate or fimbriate blade, the lobes linear 2-fid, styles usually 5. *Benth. in Royle Ill.* 80, t. 20 B. L. eriostemon, *Wall. Cat. n.* 620. Melandryum indicum *var.* fimbriatum, *Rohrb. l.c.*

12. **L. nutans,** *Benth. in Royle Ill.* 80; finely pubescent, stems diffusely dichotomously branched, leaves ovate or elliptic-lanceolate or orbicular, panicle lax few-flowered, calyx globose inflated, nerves green or brown, lobes short rounded, carpophore short pubescent or 0, petals with a short purple crenulate limb, seeds reniform granulate tubercled on the back. Melandryum nutans, *Rohrb. in Linnæa,* xxxvi. 229. L. ciliata, *Wall. Cat. n.* 621.

TEMPERATE HIMALAYA, from Sikkim to Kunawar, alt. 7500–11,000 ft.; Marri, alt. 10–12,000 ft.

Very closely allied to *L. indica,* but apparently a smaller plant, more flaccid, with a shorter more globose calyx, and short crenulate corolla-limb. The upper leaves are sometimes orbicular-cordate.

13. **L. pilosa,** *Edgew. in Trans. Linn. Soc.* xx. 34; clothed especially above with long spreading flaccid hairs, stem erect or diffusely branched, leaves ovate or elliptic-lanceolate, panicle lax few-flowered, calyx oblong, nerves green, lobes short, petals with a 2-lobed limb, lobes bifid, carpophore short or long, seeds reniform, granulate on the sides, back with long processes. Melandryum nutans (a form), *Rohrb. in Linnæa,* xxxvi. 229.

WESTERN TEMPERATE HIMALAYA, from Garwhal to Kashmir, alt. 9–12,000 ft., *Royle, Edgeworth,* &c.

Very closely allied to *L. nutans,* if not, as Rohrbach considers, a variety of that plant; it is best distinguished by the long flaccid hairs, and echinate dorsal face of the seeds; the latter character is not a very good one, as a passage can be established between the seed of *L. indica* in which the dorsal granulations are but little larger than the lateral, through that of *L. nutans* to that of *L. pilosa.* There are two forms of this species, the original, with the calyx nearly an inch long and a long woolly carpophore; and another with smaller calyx (altogether like that of *L. nutans*), and a short carpophore. The styles are 5.

14. **L. cancellata,** *Jacquem. mss.;* densely hoary-pubescent, stem erect, simple, leaves elliptic-lanceolate or orbicular, panicle contracted few-flowered, flowers suberect, calyx 5-lobed to below the middle viscid glandular, lobes subacute, petals with an auricled claw and short 4-fid limb, carpophore woolly, seeds granulate.

KUNAWAR, alt. 11–12,000 ft., *Jacquemont, Royle,* &c.

Erect, rather slender, covered with close-set often rather long and spreading hairs, glandular above. *Leaves* very variable, 1–2 in. long, radical petioled, cauline sessile, acute or acuminate. *Flowers* in rather distant pairs, shortly pedicelled, inclined. *Calyx* $\frac{1}{3}$–$\frac{1}{2}$ in. long, subcampanulate, green, densely tomentose or woolly; nerves 10, meeting in the segments, broad, green; lobes oblong, erect or somewhat spreading, ciliate, tips often recurved. *Petals* with the claw woolly, limb about $\frac{1}{4}$ in. long; scales 2-fid. *Stamens* woolly. *Styles* 4–5.—The deeply cleft calyx is the best mark for this species, but possibly not a good one, as I observe some irregularity in the divisions, suggesting an abnormal condition of that organ.

The following Indian species of *Lychnis* contained in the Kew Herbarium are in too imperfect a condition for determination.

L. PUMILA, *Royle; Benth. in Royle Ill.* 80; *Rohrb. in Linnæa,* xxxvi. 227 (Melandryum).

L. CUNEIFOLIA, *Royle; Rohrb. l.c.*; a densely tomentose short large-rooted species, with spathulate leaves, in a very young state from Kunawar.

MELANDRYUM INTRUSUM, *Rohrb. in Linnæa,* xxxvi. 242, is unquestionably *Silene colorata,* an introduced plant, alluded to at p. 218.

There is a *Lychnis* in the Herbarium differing from any of the above described Indian species, in the upper leaves being linear and rounded at the tip; its flower resembles that of *L. indica.* I have seen scraps only from the Shiri Pass in Tibet, collected by Heyde, and from Dr. Stewart (locality uncertain but probably from Tibet).

9. HOLOSTEUM, Linn.

Annual glandular herbs. *Leaves* narrow. *Flowers* in terminal umbel-like cymes. *Sepals* 5. *Petals* 5, toothed or notched. *Stamens* 3–5, rarely 10. *Ovary* 1-celled; styles 3 (-5); ovules many. *Capsule* subcylindric, with twice as many short terminal valves as there are styles. *Seeds* peltate, concavo-convex, dorsally compressed, rough; embryo horse-shoe shaped.—DISTRIB. Species 3. Europe and W. Asia.

This genus is distinguished from *Arenaria* and *Stellaria* more by habit than by any easily defined character.

1. **H. umbellatum,** *Linn.*; leaves rosulate petioled elliptic-oblong. *Boiss. Fl. Orient.* i. 709.

Kashmir, *Jacquemont*, &c.—Distrib. W. Asia, N. Africa, Europe.

Stem 4–8 in., very slender, branched below. *Leaves* ½–1 in. *Flowers* few, erect; pedicels ½ in., deflexed after flowering, erect after fruiting; bracts small, membranous. *Sepals* white, obtuse, edges scarious. *Petals* rather longer, ¼ in., white or pale pink. *Stamens* and styles often 3 each. *Capsules* exceeding the sepals. *Seeds* black.

10. **CERASTIUM,** Linn.

Pubescent rarely glabrous herbs, often glandular, annual or perennial *Leaves* usually small. *Flowers* white, in terminal dichotomous cymes. *Sepals* 5, rarely 4. *Petals* as many, rarely 0, notched or 2-fid, rarely quite entire or cut. *Stamens* 10, rarely 5 or fewer, hypogynous. *Ovary* 1-celled; styles usually 3–5; ovules many. *Capsule* cylindric, often curved, with twice as many short valves as styles. Seeds compressed, not arillate; embryo annular.—Distrib. Species about 40, all natives of temperate and cold regions.

Cerastium like *Holosteum* is with difficulty distinguished by technical characters from *Arenaria* and *Stellaria.*

Sect. I. **Dichodon.** *Styles* usually 3.

1. **C. trigynum,** *Villars;* perennial, tufted, stem procumbent with alternating hairy lines or glabrous, leaves oblong-lanceolate glabrous, cymes 1–3-flowered, bracts herbaceous with membranous edges. *Boiss. Fl. Orient.* i. 715. Stellaria cerastioides, *Linn. Sp. Pl.* 604. Diplodon cerastioides, *Reichb. Ic. Fl. Germ.* f. 4915.

Alpine Western Himalaya, alt. 11–17,000 ft., from Kulu to Kashmir, and in Western Tibet, *Royle*, *Jacquemont*, &c.—Distrib. Affghanistan, Siberia, W. Asia, Arctic regions, Alps of Europe.

Nearly glabrous. *Leaves* ¼–½ in., distant, obtuse, often recurved. *Flowers* ½ in. diam.; pedicels very slender, glandular-pubescent, fruiting reflexed. *Sepals* linear-oblong, spreading, 1-nerved. *Petals* deeply 2-fid. *Styles* usually 3. *Seeds* with 8 rows of dorsal tubercles.—Altogether intermediate between *Cerastium* and *Stellaria.*

Sect. II. **Strephodon.** *Styles* 5. *Valves of the capsule* convolute or recurved at the tip, margins not revolute.

2. **C. dahuricum,** *Fisch. in Spreng. Pugill.* ii. 65; tall, glabrous or pubescent below, leaves large oblong sessile or auricled, petals twice as long as the sepals, claws bearded, capsule straight, seeds tubercled. *Boiss. Fl. Orient.* i. 717.

Western Temperate Himalaya, alt. 10–11,000 ft., from Kumaon, *Str. & Wint.* to Marri, *Stewart.*—Distrib. Dahuria, Siberia, Persia, Caucasus.

Perennial. *Stem* stout, ascending amongst shrubs to 12 ft., shining. *Leaves* 1½–2 in., connate, obtuse or acute, margined. *Cymes* with divaricating branches and pedicels, which latter are slender, ebracteolate. *Flowers* ¾ in. diam. *Sepals* elliptic-oblong, subacute, shining, with narrow scarious edges. *Petals* twice as long, obcordate, 2-lobed. *Capsule* twice as long as the calyx, striate, many-nerved; valves revolute.

3. **C. indicum,** *Wight & Arn. Prodr.* 43; slender, glandular-pubescent, leaves subsessile elliptic ovate or lanceolate acute, petals a little exceeding the calyx, capsule straight, teeth recurved. *Thwaites Enum.* 24; *Wight Ill.* i. t. 26.

Western Peninsula, Nilghiri and Pulney Mts., *Wight*, &c. Ceylon, alt. 6–7000 ft., *Thwaites.*

Perennial. *Stems* very slender, flaccid, 1–2 ft. *Leaves* 1–1½ in., membranous, not margined, ciliate, obscurely petioled. *Flowers* few, in terminal dichotomous cymes; pedicels divaricate, tomentose. *Sepals* ⅕ in., oblong lanceolate, acute, margins narrowly scarious. *Capsules* rather longer than the sepals.—There is a specimen marked as Mauritian in Herb. Benth., but I suspect it is Indian; it has, however, rather longer petals.

SECT. III. **Orthodon.** *Styles* 5. *Valves of the capsule* straight or slightly spreading; margins revolute or recurved.

4. **C. vulgatum,** *Linn.;* annual or perennial, tomentose or hairy, glandular above, lower leaves spathulate, upper oblong ovate or lanceolate obtuse or acute, petals equalling the calyx, rarely 0 or larger, capsules much exceeding the calyx often curved. *Wight & Arn. Prodr.* 43.

Throughout the temperate and subalpine regions of INDIA and CEYLON, ascending to 15,000 ft. in Sikkim and Western Tibet.—DISTRIB. Temperate N. Europe and Asia; introduced into various countries.

Stems 6–12 in., erect or suberect, simple or branched, stout or slender. *Cymes* various, few or many-flowered, open or crowded or subcapitate or subumbellate. *Flowers* ⅙–⅓ in. diam., sometimes apetalous or 5-androus. *Capsule* very variable in length, and seeds in amount of granulation or tuberculation.

VAR. 1. *glomerata*, Thuillier; annual, pubescence dense spreading, leaves obtuse, cymes at first subcapitate, fruiting pedicels suberect shorter than the sepals, bracts all herbaceous, sepals acute densely hairy, margins narrowly membranous.

VAR. 2. *trivialis*, Link; annual or perennial, cymes usually open, leaves usually lanceolate or obovate-lanceolate acute, pubescence shorter less spreading, bracts all herbaceous, sepals lanceolate, margin narrowly membranous.

VAR. 3. *grandiflora*, Don Prodr. 216 (sp.); annual, flaccid, stems 6–10 in., lower leaves obovate-spathulate, upper oblong, cymes open, bracts herbaceous, pedicels slender, petals twice as long as the calyx.—C. napalense, *Wall. Cat.* 628. Temperate Himalaya, alt. 6–10,000 ft.

? VAR. 4. *tibetica;* dwarf, densely tufted, leaves oblong or elliptic, cymes few-flowered, bracts all herbaceous, flowers as in var. 3. *grandiflora.*—Sassar pass, alt. 16–17,000 ft., *T. Thomson;* Ladak, *Stewart.* Perhaps a new species, but the specimens are very few.

? VAR. 5. *membranacea*, Jacq. mss. (sp.): stem slender erect, leaves oblong-lanceolate acute, cymes few-flowered, bracts with broad scarious edges, pedicels slender, petals larger than the broadly scarious-edged coloured sepals.—Kunawar, between Hookinghat and Doubling, *Jacquemont.*—Perhaps a different species or a small state of the following, but we have only 2 stems.

5. **C. Thomsoni,** *Hook. f.;* clothed with spreading glandular hairs, stems slender erect, leaves all linear-oblong subacute cymes few-flowered, bracts with narrow scarious edges, pedicels slender, flowers large, sepals oblong-lanceolate subacute coloured below the scarious tips, much smaller than the broadly-obovate petals.

TEMPERATE WESTERN HIMALAYA; Kishtwar, alt. 11–12,000 ft., *T. Thomson;* Kumaon, alt. 10,000 ft., *Strach. & Wint.;* Lahul, *Jaeschke.*

We were at first disposed to regard this as the *C. grandiflorum*, Don, because of the size of the flower; but that plant having broadly obovate lower leaves is no doubt Wallich's *C. napalense* (a var. of *triviale*), which has further much smaller flowers and a very different habit from this. *Stems* 6–12 in., quite erect, rather slender, copiously hairy, branched at the very base only. *Leaves* ¾–1¼ in., straight, the very lowest soon withering and more obovate. *Cymes* subumbellate. *Flowers* ½–¾ in. diam., with broad petals. *Fruit* unknown.

11. **STELLARIA,** Linn.

Herbs of various habit. *Leaves* various. *Flowers* in dichotomous cymes, more rarely solitary and terminal, white. *Petals* 5, rarely 4, 2-fid or 2-partite or 0. *Stamens* 10, rarely 8, hypogynous or perigynous. *Disk* annular or divided into glands. *Ovary* 1- rarely 3-celled; styles 3 or rarely 2–5; ovules many, rarely few. *Capsule* short, splitting to below the middle or to the base into as many entire or 2-fid valves as there are styles. *Seeds* compressed, tubercled granulate or nearly smooth; embryo annular.—DISTRIB. Species about 70, natives of all cold and temperate regions.

SECT. I. **Schizostegium,** *Fenzl.* Subscandent or decumbent herbs. *Ovary* 3-celled. *Capsule* 1–2-seeded.

1. **S. crispata,** *Wall. Cat.* 633; tall, glabrous, pubescent above, leaves large sessile oblong or linear-oblong from a cordate base long-acuminate, edges crisped, flowers small. S. monosperma, *Don Prodr.* 215.

TEMPERATE HIMALAYA, alt. 6–10,000 ft., from Sikkim to Kashmir; KHASIA MTS., alt. 5–6000 ft.

Root of fleshy fusiform fibres. *Stem* 2–4 ft., 4-angled, shining with a line of fine hairs, nodes often hairy. *Leaves* 2–9 in., often broadest beyond the middle, pale beneath, rather coriaceous, nerves very faint, one intramarginal, tips very slender, margin scarcely thickened, more or less crisped. *Cymes* much branched, pubescent, peduncles and pedicels divaricate, very slender. *Sepals* ⅙ in., oblong-lanceolate, acuminate, margin narrowly scarious. *Petals* as long or twice as long as the sepals. *Seeds* 1 or 2, granulate.

2. **S. paniculata,** *Edgew. in Trans. Linn. Soc.* xx. 35; tall, glabrous or ciliate, leaves petioled lanceolate or elliptic long-acuminate, flowers very small pubescent. S. media, *Wight Cat.* 145, *not of Linn.*

WESTERN TEMPERATE HIMALAYA, alt. 7–11,000 ft.; Sikkim, *J. D. H.*; Kumaon to Sirmur, *Royle*, *Edgeworth*, &c. KHASIA MTS., alt. 5000 ft., *Griffith*, &c. NILGHIRI MTS., *Wight*, &c.

Nearly glabrous or laxly pubescent throughout. *Stem* 2 ft. high and more, decumbent or suberect, weak, shining, with a line of hairs above. *Leaves* 1½–5 in., very variable in shape, membranous, long or shortly acuminate, nerves spreading, one intramarginal. *Cymes* glandular pubescent, much branched; peduncles and pedicels very slender, spreading. *Sepals* pubescent, oblong-lanceolate, acute, ⅛–⅙ in. *Petals* notched, shorter than the sepals. *Capsule* equalling the calyx. *Seeds* wrinkled.

3. **S. drymarioides,** *Thwaites Enum.* 24; procumbent, rooting, glabrous below, glandular-pubescent above, leaves petioled orbicular or broadly elliptic acute or apiculate, flowers small densely pubescent.

CEYLON: Harpootelle pass, alt. 4000 ft., *Walker*, *Thwaites*.

Stems slender, flaccid, 4-angled; branches erect. *Leaves* ½–1½ in. diam., with a few scattered hairs; petals $\frac{1}{10}$–⅛ in.; nerves spreading. *Cymes* with long slender spreading peduncles and pedicels, the latter often thickened upwards. *Petals* 2-fid, half as long as the sepals. *Disk* 5-lobed. *Capsule* included, 1-seeded.—Closely allied to *S. paniculata* and probably a broad-leaved state of that plant, the foliage and habit closely resemble *Drymaria cordifolia*, which may at once be distinguished by the nervation of the leaf.

SECT. II. **Malachium,** *Fries.* *Sepals* free to the base. *Stamens* hypogynous. *Styles* usually 5. *Ovary* 1-celled. *Capsule* with 5 2-fid valves, many-seeded.

4. **S. aquatica,** *Scopoli*; slightly glandular above, stem diffuse decumbent angular, leaves ovate-cordate. Cerastium aquaticum, *Linn.* Malachium aquaticum, *Fries*; *Boiss. Fl. Orient.* i. 731.

TEMPERATE HIMALAYA; from Nipal to Marri, alt. 4–8000 ft.—DISTRIB. N. and W. Asia, N. Africa, Europe.

Perennial. *Stem* 1–3 ft., brittle, branched, often trailing over bushes. *Leaves* 1–1½ in., membranous, lower shortly petioled, acute, sometimes ciliate. *Flowers* ½ in. diam., axillary. *Sepals* lanceolate, enlarged in fruit. *Petals* with diverging lobes. *Capsule* 1 in., ovoid, rather exceeding the sepals; peduncle deflexed, curved at the tip. *Seeds* globose, tubercled.

SECT. III. **Stellaria** proper. *Sepals* free to the base. *Stamens* hypogynous or subperigynous. *Ovary* 1-celled; styles 2–3. *Capsule* with 4–6 entire valves. *Seeds* numerous, rarely few.

5. **S. media,** *Linn.*; stem procumbent with a line of hairs, leaves ovate acuminate lower petioled upper sessile, cymes many-flowered, sepals green subacute or obtuse, petals shorter than the glandular sepals or 0, stamens 3–10, styles 3, seeds opaque strongly tubercled or echinate. *Wall. Cat.* 631; *Wight Ic.* t. 947; *Boiss. Fl. Orient.* i. 707. S. monogyna, *Don Prodr.* 215. Alsinella Wallichiana, *Benth. in Wall. Cat.* 630.

Throughout the PANJAB, and temperate regions of India, ascending in the HIMALAYA to 12,000 ft., and in WESTERN TIBET to 14,500 ft. CEYLON; Newera Ellia, probably introduced.—DISTRIB. All Arctic and N. temperate regions, a doubtful native elsewhere.

A very common and most variable weed. *Stems* 6 in. 2 ft., generally much branched, flaccid, green. *Leaves* ½–1 in., lower long-petioled, ovate or cordate, upper sessile, elliptic or lanceolate. *Flowers* axillary and in terminal cymes, ¼–⅓ in. diam.; pedicels slender, glabrous or glandular-pubescent. *Sepals* obtuse or subacute, hairy glandular or covered with raised points. *Capsule* ovoid, longer than the sepals. *Seeds* brown, acutely tubercled.—*Flowers* 4-merous and apetalous in Alpine Sikkim specimens.

6. **S. sikkimensis,** *Hook. f.*; decumbent, stems shining below, much branched laxly pubescent or villous with spreading hairs, leaves small sessile ovate or ovate-lanceolate rarely cordate, cymes terminal many-flowered, sepals lanceolate acuminate pilose much exceeding the 2-partite petals, stamens 10, styles 3, capsule not exceeding the sepals.

SIKKIM HIMALAYA; common, alt. 5–9000 ft., *Herb. Griffith, J. D. H.*

Often forming matted tufts, clothed with flaccid brown spreading hairs. *Leaves* ⅓–⅔ in., spreading recurved or reflexed, acute, very shortly-petioled, opaque, hairy on both surfaces and ciliate. *Flowers* ¼ in. diam.; pedicels rather longer than the sepals, spreading, decurved in fruit. *Sepals* with broad scarious margins. *Capsule* elongate ovoid, rather longer than the sepals; valves 5, entire. *Seeds* many, minute, opaque, scarcely tubercled.—Subalpine specimens have more coriaceous deflexed leaves, with strongly recurved margins. Nearly allied to *S. saxatilis*, but less perigynous, more laxly hairy, and cymes much shorter peduncled and terminal.

7. **S. semivestita,** *Edgew.*; more or less woolly, stem elongate stout decumbent much branched leafy, leaves spreading and recurved subulate, peduncles axillary much exceeding the leaves, sepals lanceolate acuminate with broad scarious margins shorter than the petals, stamens 10, styles 3.

WESTERN TEMPERATE HIMALAYA; Kumaon, alt. 6–8000 ft.; Lohoo-ghat and Dadooka Taola, *T. Thomson;* Chaur, *Strach. & Wint.*

Forming large compact or lax tufts. *Stems* 6–18 in., terete below; branches ascending, crowded, very leafy, white with woolly hairs. *Leaves* ½–⅔ in., gradually recurved from a broad base, 1-nerved, woolly on both surfaces or glabrate. *Flowers* ½ in. diam.; peduncles 1 in., very woolly. *Sepals* ¼ in., very acuminate, back striate, tomentose. *Petals* 2-partite, rather broad. *Fruit* unknown.

8. **S. Webbiana,** *Wall. Cat.* 642 (Leucostemma); glabrous, stem slender decumbent branched leafy, leaves spreading linear or acicular, pedicels

axillary capillary very long, sepals lanceolate acuminate much shorter than the 2-fid petals, stamens 8, styles 2. *Benth. in Royle Ill.* 81, t. 21, f. 2.

WESTERN TEMPERATE HIMALAYA, alt. 5–6000 ft., from Kumaon to Sirmur, *Blinkworth*, &c.

Stems zigzag, 6–12 in., 4-angled. *Leaves* ½ in., shining, with long acicular points, 1-nerved, sessile, rather rigid. *Flowers* axillary, suberect, ½ in. diam.; pedicels strict, 1–2 in., erect in fruit. *Sepals* shining, ¼ in.; back striate, margins broadly scarious shining. *Petals* 2-fid to about the middle, lobes narrow obtuse. *Capsule* equalling the sepals, ovoid, 6-valved. *Seeds* pale-brown, reniform, compressed, back echinate with long processes.

9. **S. latifolia,** *Benth. in Wall. Cat.* 643 (Leucostemma); glabrous below, tomentose above, stems decumbent flaccid laxly tufted, leaves subsessile margins acuminate, lower broad-ovate or cordate, upper elliptic, pedicels very slender, sepals oblong or subulate-lanceolate much shorter than the 2-fid petals, stamens 8, styles 2, capsule much shorter than the sepals. *Benth. in Royle Ill.* 81, t. 21, f. 1.

WESTERN TEMPERATE HIMALAYA, alt. 6–8000 ft.; Kumaon, *Blinkworth*, &c.; Garwhal, *Falconer*.

Stems 2–10 in., flexuous, 4-angled, glabrous, shining except the young, which are laxly tomentose, much branched. *Leaves;* lower, ½–⅔ in., almost orbicular at times, shortly petioled, suddenly mucronate, margins thickened, veins diverging, upper smaller narrower. *Flowers* ½ in. diam.; pedicels terminal and in the uppermost axils, capillary, glabrous. *Sepals* green, with a narrow scarious border. *Petals* 2-fid to about the middle, lobes oblong obtuse. *Capsule* short, ovoid, included, membranous, hyaline, apparently bursting irregularly. *Seeds* orbicular, brown, nearly smooth.

10. **S. bulbosa,** *Wulf.*; rhizome slender creeping tuberiferous, stem slender simple with a line of hairs, leaves few obovate or elliptic-lanceolate subacute, pedicel solitary subterminal capillary erect, sepals 4–5 much shorter than the broad petals. *DC. Prodr.* i. 397; *Cesati in Linnæa*, xxxii. 253, t. 1. Kraschninnikowia rupestris, *Turcz. in Led. Fl. Ross.* i. 373.

TEMPERATE HIMALAYA, in woods at the roots of trees; Bhotan, *Griffith;* Sikkim, alt. 10–12,000 ft., *J. D. H.* Jamu to Marri, alt. 6–9000 ft., *Jacquemont*, *Thomson*, &c.—DISTRIB. Siberia, Carinthia, N. Italy.

A very peculiar and interesting little plant in respect of structure and distribution, confined to Carinthia and Transylvania in Europe, and to Siberia and the Himalayas in Asia. *Stem* 1–5 in., erect, very slender. *Leaves* 2–6 pairs, 1–1½ in. long, rather fleshy, sessile or contracted into a petiole; margins sometimes ciliate; midrib slender, nerves very obscure. *Flowers* often dimorphic, the lower on the plant from the inferior pedicels or rhizomes being minute apetalous and ripening seeds, the subterminal large, ½ in. diam, rarely or not producing seed. *Sepals* herbaceous, oblong-lanceolate or lanceolate, ½–⅔ in. shorter than the white petals. *Anthers* purple. *Styles* filiform. *Capsule* 8-angled, 4-valved to the base. *Seeds* few, large, tuberculate.—The seeds of Siberian specimens have long processes on the back.

11. **S. tibetica,** *Kurz in Regensb. Flora.* 1872, 285; whole plant densely glandular-pubescent, stem ascending rather robust, leaves sessile oblong subacute or acute, cymes erect peduncled few-flowered, peduncle and pedicels stout, bracts ovate coriaceous, sepals much shorter than the petals, elliptic acute margins submembranous.

WESTERN TIBET; on limestone rocks near Trantse Lundo, in Karnag, alt. 14–17,000 ft., *Dr. Stoliczka.*

Stem 3–5 in., cylindric, base glabrous shining. *Leaves* suberect, ½–¾ in., opaque, midrib slender, nerves obscure. *Cymes* axillary and terminal, robust; pedicels longer or shorter than the flowers, the lateral 2-bracteolate. *Flowers* ½ in. diam., erect. *Calyx* rounded at the base, quite free. *Petals* half as long again as the sepals, 2-fid to the middle. *Filaments* slender, hypogynous. *Disk* 0. *Styles* 3, slender; ovules numerous, *Capsule* broadly ovoid, shorter than the sepals, 6-valved, inserted by a very narrow base. *Seeds* (unripe) apparently solitary, large, muricate.

SECT. IV. **Larbræa,** *St. Hil.* *Sepals* more or less connate at the base into an obconic tube. *Stamens* 8–10, perigynous; filaments linear or subulate, not suddenly dilated at the base. *Ovary* 1-celled; styles 3, rarely 4. *Capsule* 4–6-valved; valves entire. *Seeds* numerous.—Usually flaccid laxly cæspitose herbs.

* *More or less pubescent woolly or silky.*

12. **S. lanata,** *Hook. f.;* stems slender decumbent glabrous below, branches pedicels sepals and leaves beneath densely woolly, leaves spreading and recurved linear-oblong, sepals small oblong acute, petals minute, stamens 8, styles 3, capsule twice as long as the sepals.

SIKKIM HIMALAYA, alt. 9–14,000 ft., in gravelly places, *J. D. H.*

Stems laxly tufted, very slender, 8–12 in., below cylindric and shining; branches 4-angled and leaves beneath clothed with snow-white soft wool. *Leaves* ¼–⅜ in., sessile or subcordate at the base, opaque above, 1-nerved, narrowed to the point, but hardly acuminate, dull green. *Cymes* few-flowered, terminal. *Flowers* ⅛ in. diam.; pedicels rather longer than the leaves, erect in fruit, rarely deflexed. *Sepals* with narrow scarious margins. *Petals* very obscure, 2-fid or 2-partite, lobes slender. *Capsule* oblong-ovoid, 4–6-valved. *Seeds* brown, reniform, granulate.

13. **S. longissima,** *Wall. Cat.* 632; stems slender decumbent glabrous below, branches pedicels and leaves softly silky, leaves sessile linear-oblong or -lanceolate spreading or recurved, pedicels slender, sepals narrow-lanceolate equalling the 2-partite petals, stamens 10, capsule shorter than the sepals 5-cleft. S. patens, *Don Prodr.* 215. S. Fenzliana *and* S. mollis, *Klotzsch in Bot. Reis. Pr. Waldem.* p. 141, t. 29.

TEMPERATE HIMALAYA, alt. 8–12,000 ft., from Sikkim, *J. D. H.*, to Sirmur, *Jacquemont.*

Stems 6–18 in., much-branched, laxly tufted, cylindric below, 4-angled above, upper parts and leaves on both surfaces and peduncles clothed with long lax silky hairs. *Leaves* ¾–1¼ in., sessile, acute, flat, opaque, 1-nerved. *Flowers* ½ in. diam., axillary or in terminal few-flowered cymes; peduncle erect, ¼–1 in.; bracts with scarious edges. *Sepals* ⅕ in., glabrous, with broad scarious margins. *Petals* with rather broad segments, usually deeply 2-partite. *Filaments* slender. *Capsule* ovoid, 5-valved. *Seeds* dark-brown, minute, turgid, tubercled.—Klotzsch's *L. Fenzlii* is distinguished by the more deeply divided petals and by being less pubescent.

14. **S. saxatilis,** *Hamilt. in Wall. Cat.* 634; stem long decumbent shining, upper parts densely soft tomentose, leaves subsessile ovate elliptic or oblong rarely cordate acute tomentose on both surfaces, cymes axillary, sepals tomentose exceeding the 2-partite petals, stamens 10, styles 3–4, capsules equalling the sepals. *Don Prodr.* 215.

TEMPERATE EASTERN and CENTRAL HIMALAYA; Nipal, *Wallich;* Bhotan, in wet places, alt. 5–7000 ft., *Griffith.* KHASIA MTS., alt. 5–6000 ft., *Simons,* &c.—DISTRIB. Java, Siberia, Japan.

Stems 2–3 ft., laxly tufted, cylindric; pubescence of the upper parts, leaves and inflorescence close dense almost woolly, sometimes very thick and closely appressed. *Leaves* ⅓–1½ in., sessile or very shortly petioled, midrib faint. *Cymes* on slender peduncles, usually from the forks, very slender, subumbellately branched, pedicels 1–1½ in., divaricating; bracts linear-subulate. *Flowers* ⅓ in. diam. *Sepals* almost woolly, oblong, acute, margin very narrowly membranous. *Petals* 2-partite. *Filaments* slender, *Capsule* 5-valved. *Seeds* almost black, tubercled.—Some Bhotan specimens have very densely tomentose cordate thick almost coriaceous leaves. The Javanese have recurved much more glabrous and acute leaves.

** *Glabrous, or leaves ciliolate towards the base only.*

15. **S. graminea,** *Linn.*; glabrous, stem very slender (rarely short) suberect 4-angled, leaves sessile narrow linear-oblong acute, margins thickened smooth often ciliate towards the base, cymes terminal branched or reduced to one flower, sepals linear-oblong 3-nerved margin narrow equalling the petals, stamens 10, capsule shorter than the sepals. *Boiss. Fl. Orient.* i. 707.

WESTERN TIBET; alt. 11–15,000 ft., *T. Thomson.*—DISTRIB. Affghanistan to W. Europe.

Everywhere glabrous except the margins of the leaf towards its base. *Stems* 3–10 in., suberect or decumbent and tufted, shining, 4-angled. *Leaves* $\frac{1}{4}$–1 in., sessile, narrowed at the base, sides almost parallel, opaque, somewhat glaucous, midrib and nerves obscure, margins thickened, quite smooth, sometimes undulate. *Cymes* spreading; pedicels very slender, divaricating, $\frac{1}{4}$–1 in.; bracts oblong-lanceolate, with broadly scarious margins. *Flowers* erect, about $\frac{1}{3}$ in. diam. *Sepals* green, shining, obtuse or acute. *Petals* 2-partite. *Filaments* slender. *Styles* 3. *Capsule* always shorter than the sepals, 5–6-valved. *Seeds* orange-brown, granulate.

VAR. *montioides;* stems short densely tufted, leaves small short, cyme reduced to 1 flower.—Alt. 15–17,000 ft.

16. **S. glauca,** *Withering;* quite glabrous, stem suberect or erect 4-angled, leaves sessile oblong or linear-lanceolate acuminate, margins thickened perfectly glabrous, pedicels subsolitary terminal and axillary slender spreading in fruit, sepals linear-oblong half as long as the broad 2-lobed petals, stamens 10, capsule equalling the sepals. *Boiss. Fl. Orient.* i. 708.

WESTERN TEMPERATE HIMALAYA; Lahul, *Jaeschke;* WESTERN TIBET, Indus valley, *T. Thomson.*—DISTRIB. Siberia, W. Asia, Europe, Greenland.

Perennial. *Stems* 1–2 ft., slender. *Leaves* 1–2 in., sessile, base rounded, ascending or erecto-patent, midrib distinct, nerves obscure. *Flowers* $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; pedicels rather stout, strict, 1–3 in.; bracts membranous. *Sepals* oblong- or lanceolate-oblong, acute or acuminate, green, 3-nerved, margins broadly scarious. *Filaments* slender. *Capsule* broadly ovoid, equalling the sepals, on rather spreading pedicels. *Seeds* strongly granulate.

17. **S. uliginosa,** *Linn.;* glabrous or with a few hairs at the base of the leaves, stems slender 4-angled, leaves sessile small ovate or oblong, lanceolate, cymes axillary and terminal, pedicels at length deflexed, sepals lanceolate acute, petals minute or 0, stamens 10, styles 3, capsule equalling or a little exceeding the sepals. *Boiss. Fl. Orient.* i. 708. S. thymifolia, *Wall. Cat.* 636 (apetalous, leaves short broad). S. aquatica, *Poll.*; *Wall. Cat.* 635 (glaucous, leaves oblong).

TEMPERATE and ALPINE HIMALAYA; in wet places, from 4–10,000 ft. (to 16,000 ft. in Sikkim), common. KHASIA MTS., alt. 5–6000 ft. NILGHIRI MTS., *Wight.*—DISTRIB. Temperate N. Hemisphere.

Annual, very variable in size and habit, much branched, very leafy and copiously flowering, often glaucous. *Stem* 6–18 in., erect or diffuse. *Leaves* rarely $\frac{1}{2}$ in., with often thickened sometimes undulate margins and mucronate tip. *Cymes* slender, peduncles short or long; bracts scarious. *Flowers* $\frac{1}{4}$ in. diam., sometimes solitary, pedicels slender. *Calyx-tube* obscure. *Filaments* slender. *Capsule* ovoid, 6-valved. *Seeds* small, minutely tubercled.

18. **S. subumbellata,** *Edgew.*; perfectly glabrous, stem very slender ascending, leaves sessile linear or elliptic-oblong acute, cymes terminal or

flowers solitary, pedicels capillary deflexed in fruit, flowers very small, sepals ovate-lanceolate acute, petals 0, stamens 5, styles 3, capsule cylindric twice as long as the sepals.

Interior of the SIKKIM HIMALAYA, alt. 12–16,000 ft., *J. D. H.* WESTERN TIBET; Nubra, alt. 11–15,000 ft., *T. Thomson.*

Stems 6 in. high in Nubra specimens very slender simple, stouter shorter and more tufted in the Sikkim ones. *Leaves* $\frac{1}{3}$–$\frac{1}{2}$ in., with thickened margin and tip, not mucronate. *Flowers* $\frac{1}{6}$ in. diam..; pedicels $\frac{1}{2}$–1 in.; bracts scarious. *Calyx* base obscure; sepals green, strongly 3-nerved, with broad scarious margins. *Filaments* slender. *Styles* short. *Capsule* $\frac{1}{6}$ in. long, straight, 5-valved. *Seeds* pale brown, distinctly granulate.—Very near the Baikal *S. umbellata*, Turcz. (Led. Flor. Ross. i. 394), but the bracts are not numerous and crowded, and the seeds are not perfectly smooth, but strongly granulate.

19. **S. depauperata,** *Edgew.*; quite glabrous, stems slender flexuous red-brown, leaves spreading and recurved sessile oblong-lanceolate acute, pedicels few axillary and terminal elongate curved wiry, flowers small, calyx with a broad turbinate base, sepals lanceolate acute petals 0, styles 3 very short, capsule 6-valved, seeds few.

ALPINE SIKKIM HIMALAYA; Yeumtong in gravelly places, alt. 15,000 ft., *J. D. H.*

A very singular little species, of which there are but few specimens, all gathered in one spot. *Stems* 3–4 in., wiry, flexuous, 4-angled, dark red brown. *Leaves* few, $\frac{1}{4}$–$\frac{1}{3}$ in., in distant pairs. *Pedicels* $\frac{1}{2}$–1 in. long, wiry, flexuous. *Calyx* base large and broad; sepals $\frac{1}{8}$ in., dark green with broad scarious edges. *Filaments* linear. *Ovary* short, ovoid; styles 3, very short. *Capsule* shorter than the sepals.—The structure of the flower approaches that of Sect. *Adenonema.*

SECT. V. **Adenonema,** *Bunge.* *Sepals* connate at the broad base. *Petals* minute or 0, rarely equalling the sepals. *Stamens* 8–10, perigynous; filaments dilated at the base. *Disk* glandular. *Ovary* 1-celled; styles 3. *Capsule* 3–5-valved. *Seeds* 1 or few or many.—Densely tufted Alpine herbs.

20. **S. decumbens,** *Edgew. in Trans. Linn. Soc.* xx. 35; laxly or densely tufted, usually very shining, stems stout or slender and pedicels densely pubescent or villous, branches sparse or closely imbricate often fascicled in axillary globose tufts, ovate or oblong or lanceolate-subulate acicular-pointed (rarely acute or obtuse) 1-nerved, margins thickened glabrous or ciliate, flowers solitary or cymose, sepals 4–5 oblong-lanceolate, petals usually very short 2-partite narrow, capsule shorter than the sepals, seeds 2–8 opaque nearly smooth suborbicular.

ALPINE AND SUBALPINE HIMALAYA, in rocky and gravelly places, alt. 11–15,000 ft. (18,000 ft. in Sikkim).

A very common and variable Alpine Himalayan plant, allied to *S. petræa,* Bunge, but at once distinguished by its shorter shining less rigid leaves, and denser pubescence.—We are quite unable to distinguish the following varieties specifically, though var. 4 is less connected by intermediates than the others, and may be different.

a. Flowers solitary.

VAR. 1; tufts large lax shining 6–18 in. broad, leaves $\frac{1}{4}$ in. usually imbricate often in axillary tufts usually ovate-subulate, sepals 5, petals minute.—S. petræa, *Herb. Ind. Or. H. f. & T. (not of Bunge).*—Sikkim and Kunawar.

VAR. 2. *Edgeworthii;* tufts lax shining, stems slender, leaves sparse slender spreading $\frac{1}{3}$ in. subulate-lanceolate, petals minute.—S. decumbens, *Edgew. l.c.*—Kumaon.

VAR. 3. *minor;* stems slender 2–4 in., leaves shining or not $\frac{1}{8}$ in. ovate- or lanceolate-subulate often in axillary fascicles, sepals 4, petals minute.—Sikkim.

VAR. 4. *Stracheyi;* stems slender 2–4 in., leaves $\frac{1}{8}$ in. not shining ovate-subulate, petals equalling the 5 sepals.—Kumaon, alt. 12–13,000 ft., *Str. & Wint.* (*with S. & W. No.* 6).

VAR. 5. *pulvinata;* forming dense globose or cushion-like masses, opaque or shining, leaves densely imbricate ovate-subulate or the lower oblong and rounded at the tip usually ciliate, sepals 4–5 coriaceous.—Garwhal, at great elevations, 16–18,000 ft., *Str. & Wint.;* WESTERN TIBET, *T. Thomson;* Sikkim, *J. D. H.*

b. Flowers cymose.

VAR. 6. *polyantha;* tufts dense shining, stem stout, leaves $\frac{1}{4}$–$\frac{1}{2}$ in., ovate- or lanceolate-subulate ciliate or pubescent, cymes sessile many-flowered, sepals 5, petals minute.—Kashmir, *Royle;* Sikkim, *J. D. H.*

VAR. 7. *acicularis;* stems lax and leaves very shining, leaves erecto-patent rigid narrow subulate-lanceolate keeled, margins smooth, cymes peduncled lax many-flowered, bracts large concave scarious, sepals 4–5, petals minute.—Sikkim, at Tungu, alt. 12–14,000 ft.

12. BRACHYSTEMMA, Don.

A diffuse subscandent branching herb. *Leaves* lanceolate. *Flowers* numerous, in axillary or terminal panicles. *Sepals* 5, subscarious. *Petals* 5, minute, narrow and quite entire. *Stamens* 10, 5 without anthers. *Ovary* 1-celled; styles 2; ovules 4. *Capsule* globose, depressed, 4-valved, 1-seeded. *Seed* reniform or globose, tuberculate.

1. **B. calycinum,** *Don Prodr.* 646; *Fenzl in Endl. Atakt.* t. 16.

TEMPERATE CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich;* Sikkim, alt. 4-7000 ft., *J. D. H.;* Bhotan, *Griffith;* KHASIA MTS., alt. 3000 ft.

Glabrous *Stems* 6–8 ft., clambering amongst bushes, 4-angled, shining, brittle. *Leaves* 1$\frac{1}{2}$–3 in., petioled, ovate-lanceolate, acute, glabrous beneath, triple-nerved, margins obscurely crenulate. *Cymes* 3–6 in., pedicelled, terminating lateral branches or axillary; bracts linear; pedicels slender. *Flowers* $\frac{1}{2}$–$\frac{2}{3}$ in. diam. *Sepals* oblong-lanceolate. *Petals, stamens* and *pistil* all very small compared with the scarious sepals.

13. ARENARIA, Linn.

Annual or perennial, often tufted herbs. *Leaves* broad or narrow. *Flowers* white or pink, solitary or in dichotomous cymes. *Sepals* 5. *Petals* 5, entire lacerate or retuse, never 2-fid or 2-partite, rarely 0. *Stamens* 5, perigynous or subhypogynous. *Stamens* 10, rarely 5, hypogynous or more often inserted on the perigynous lobed or annular disk. *Ovary* 1-celled; styles 3–4 (rarely 2); ovules usually many. *Capsule* short, rarely exceeding the sepals, valves 2–6. *Seeds* compressed or turgid, smooth or tubercled.—DISTRIB. Species about 130, all natives of cold and temperate regions.

A. Capsule with as many valves (usually 3) as there are styles.

SECT. I. **Alsine.** Annual or perennial herbs. *Leaves* in the Indian species broad flat. *Flowers* small, cymose white. *Calyx* not thickened at the base. *Styles* 3. *Seeds* compressed, striate or granulate.

1. **A. trichotoma,** *Royle mss.;* perennial erect, dichotomously branched, branches long strict spreading finely pubescent, leaves glabrous linear or linear-oblong from a broad sessile base, cymes long peduncled trichotomous, pedicels slender, bracts scarious, petals equalling or exceeding the ovate-oblong acute broadly-margined sepals, seeds 3–5 orbicular compressed.

WESTERN TEMPERATE HIMALAYA; Kunawar, alt. 8–10,000 ft., *Jacquemont, Royle,* &c.—DISTRIB. Affghanistan.

Nearly glabrous, 1–1$\frac{1}{2}$ ft. *Stems* rather stout and flexuous at the base; branches terete, very strict. *Leaves* $\frac{1}{2}$–$1\frac{1}{2}$ in. in distant pairs, or spuriously whorled, subacute, thick, opaque, 1-nerved, acute, margins somewhat recurved. *Cymes* very lax, strict, slender, branches and pedicels very long; bracts and bracteoles small. *Flowers* $\frac{1}{4}$ in. diam., erect. *Calyx* rounded and not hardened at the base; sepals quite glabrous, obscurely 1-nerved. *Styles* 3, slender. *Capsule* subglabrous, 3-valved. *Seeds* striolate, much compressed, pale red-brown.

2. **A. Meyeri,** *Boiss. Fl. Orient.* i. 682 (Alsine); annual, fastigiately dichotomous, clothed with spreading glandular hairs, leaves suberect subulate 7-nerved, pedicels short, sepals rigid subulate-lanceolate strongly nerved, petals very short, seeds small granulate.

PANJAB, near Peshawur, *Vicary, Stewart.*—DISTRIB. Affghanistan, and westward to Syria and Asia Minor.

A small rigid erect annual, 4–6 in. *Stems* cylindric. *Leaves* $\frac{1}{4}$–$\frac{1}{2}$ in., more or less recurved. *Calyx* $\frac{1}{3}$ in. long; base rounded or subacute; sepals erect, rigid, green, slightly recurved, pungent, outer 5-, inner 3-nerved, nerves and margins white. *Petals* ovate-oblong. *Stamens* sometimes 6 and 7. *Styles* 3. *Capsule* oblong, much shorter than the sepals, 3-valved. *Seeds* red-brown, orbicular reniform, compressed.

3. **A. foliosa,** *Royle mss.;* quite glabrous, loosely tufted, stems much branched, branches slender leafy, leaves very narrow linear subacute spreading often flexuous 1–3-nerved, cymes long-peduncled subumbellate, bracteoles short ovate, sepals ovate-lanceolate acuminate strongly 3-nerved shorter than the entire petals, capsule ovoid rather longer than the sepals, valves recurved, seeds reniform dorsally granulate. Alsine Roylei, *Fenzl in Herb. Benth.*

WESTERN SUBALPINE HIMALAYA, alt. 9–13,000 ft., from Garwhal to Kashmir, *Royle, Jacquemont,* &c.

Perennial, branched from the base; branches 2–6 in., loosely or densely leafy. *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in., usually spreading, never rigid or pungent, not $\frac{1}{16}$ in. broad, bright green. *Peduncles* sparingly leafy, strict, erect; bracts and bracteoles coriaceous, acute, concave; pedicels equalling or exceeding the sepals. *Calyx* rounded and not indurated at the base; sepals $\frac{1}{6}$ in., coriaceous, pungent, nerves much raised, inner with scarious edges. *Capsule* 3-valved. *Seeds* small, pale brown.—Perhaps a form of *A. juniperina,* Fenzl (Boiss. Fl. Orient. i. 677), a native of Persia and W. Asia.

4. **A. kashmirica,** *Edgew.;* glandular-pubescent rarely glabrous, densely tufted, stems much branched, branches leafy, leaves narrowly linear-subulate acute spreading strongly 3-nerved, cymes peduncled subumbellate, bracteoles ovate-subulate strongly nerved, sepals ovate-lanceolate acuminate strongly 3-nerved shorter than the entire petals, capsule ovoid rather longer than the sepals, valves recurved.

WESTERN TEMPERATE HIMALAYA, alt. 6–7000 ft., *T. Thomson;* Lahul, *Jaeschke;* WESTERN TIBET, *Falconer.*

Very similar to *A. foliosa,* but usually glandular-pubescent throughout, leaves more subulate and rigid, very strongly nerved, lateral nerves often marginal, and bracts very different; flowers smaller; pedicels often shorter than the sepals; petals longer; the capsule and seeds are similar.

B. Capsule with twice as many valves as there are styles.

SECT. II. **Eremogoneæ.** Perennials, usually densely tufted. *Leaves* crowded, subulate rigid setaceous or grass-like. *Sepals* often hardened at the base. Disk-glands usually large.

* *Peduncles elongate. Flowers usually cymose.*

5. **A. festucoides,** *Benth. in Royle Ill.* 81, t. 21, f. 3; densely tufted,

leaves densely crowded subulate pungent rigid recurved 1-nerved beneath ciliolate, peduncles 1- or few-flowered glandular-pubescent, sepals lanceolate or subulate-lanceolate straight or recurved 1–3-nerved, margins broadly scarious shorter than the petals, capsule oblong 5–6-valved to the base shorter than the sepals, seeds flat with a narrow fimbriate wing.

Western Alpine Himalaya, from Kumaon to Kunawar; alt. 11–13,000 ft., *Royle, Jacquemont*, &c. Western Tibet, Karnali river, alt. 15,500 ft., *Strach. & Wint.*

Very variable in stature, 2–8 in. *Leaves* with axillary fascicles, ¼–1½ in., shining, rather concave above, usually recurved, pungent, margin ciliolate, nerve strong beneath. *Peduncle* 1–6 in., erect or curved, leafy, 1- rarely 2–5-flowered, always very glandular; bracts ovate-subulate, with broadly scarious margins; pedicels shorter or longer than the sepals. *Calyx* scarcely thickened at the base; sepals ¼ to nearly ½ in., from ovate-lanceolate to subulate lanceolate, sometimes falcate, long acuminate, pungent, margin broadly scarious, back green with 3 approximate nerves, glabrous or glandular-pubescent. *Petals* sometimes twice as long as the sepals, obovate, variable in length and breadth. *Capsule* coriaceous, rarely equalling the sepals. *Seeds* very flat, pale.

Var. *imbricata;* smaller, stems very short densely tufted, leaves ¼ in., peduncles very short. ? A. imbricata, *M. Bieb. Fl. Taur. Cauc.* i. 344, which differs only in the capsule exceeding the sepals.—Ledebour and Boissier (*Fl. Orient.* i. 673), both refer *A. imbricata* to *Alsine*, but the capsule in original specimens is distinctly 6-valved.

6. **A. Griffithii,** *Boiss. Fl. Orient.* i. 697; suffruticose, tufted, glabrous or glandular, leaves densely crowded short subulate pungent rigid straight or recurved 1-nerved beneath ciliolate, peduncle several-flowered, sepals ovate acute concave obscurely nerved shorter than the petals, capsule globose 6-valved shorter than the sepals.

Western Tibet; Dras valley, alt. 8–10,000 ft., *T. Thomson.*—Distrib. Affghanistan.

A more robust species than *A. festucoides*, with usually shorter though quite as rigid leaves, short concave ovate-subulate bracts, more numerous and smaller flowers, calyx rounded and much thickened at the base, broader sepals, and a globose or very broadly ovoid coriaceous capsule.

** *Flowers always solitary, sessile or very shortly pedicelled.*

7. **A. musciformis,** *Wall. Cat.* 6401; glabrous, most densely tufted, root long woody, stem very short densely leafy, leaves subulate spreading and recurved rigid minutely ciliate, flowers sessile solitary, sepals oblong-lanceolate acute 3-nerved rather shorter and narrower than the linear obovate petals.

Alpine Eastern and Western Tibet, alt. 16–18,000 ft., *Webb, Jacquemont;* Balch pass, *Strach. & Winterb.;* Karakoram and Parang passes, &c., *T. Thomson;* Tibetan Sikkim, alt. 15–16,000 ft., *J. D. H.*

Forming matted hard tufts; roots very long, strong, woody. *Leaves* subsquarrose when dry pale green, ⅙–⅓ in., with broad sheathing scarious bases, 1-nerved below. *Flowers* sessile, solitary, ⅓ in. diam. *Calyx* narrow subtruncate and hardened at the base; sepals green with broad scarious margins, outer 3-, inner 1-nerved. *Petals* persistent, tip rounded. *Filaments* long, slender. *Styles* 3, slender. *Capsule* apparently never fertilized in the specimens collected, small, globose, 5–6-valved to the base.—The leaves of the Sikkim specimen are ½ in., which is longer than those of the Western Himalaya.

8. **A. polytrichoides,** *Edgew.;* most densely tufted, branches together with the most densely imbricating leaves cylindric, leaves short spreading and recurved subulate from a broad scarious sheathing base rigid pungent, channelled in front convex on the back, margins thickened obscurely ciliate towards the base, flowers minute subsessile, sepals broadly elliptic obtuse, petals larger broadly obovate, capsule broad equalling the sepals.

Tibetan region of the Sikkim Himalaya, alt. 14–17,000 ft., *J. D. H.*

Forming hemispherical moss-like tufts of densely packed cylindric stems 1–4 in. long, clothed with old leaves below, together with these about $\frac{1}{4}$ in. diam. *Leaves* $\frac{1}{8}$–$\frac{1}{4}$ in., bright green, shining. *Peduncles* lengthening a little in fruit. *Calyx* rounded and much thickened at the base; sepals $\frac{1}{10}$ in., very obtuse, concave, without scarious margins, obscurely 3-nerved. *Petals* broader and longer than the sepals, obovate. *Filaments* slender. *Styles* 3. *Capsule* broadly ovoid, coriaceous, 1-celled, shortly 5–6-valved. *Seeds* small, black, rather angular, nearly smooth.

9. **A. monticola,** *Edgew.;* glabrous, very densely tufted, branches densely leafy, leaves short spreading and recurved subulate from a broad scarious sheathing base rigid tip acicular margin thickened minutely ciliate, midrib prominent on both surfaces, floral larger lanceolate-subulate scarious, flowers large sessile, sepals ovate-lanceolate acuminate with 3 close-set green nerves in the axis much smaller than the broad obovate petals.

Tibetan region of the Sikkim Himalaya, alt. 15–16,000 ft., *J. D. H.*

Forming large subsquarrose green patches, 6–12 in. broad; roots long, woody; branches with the leaves about $\frac{2}{3}$ in. diam. *Leaves* $\frac{1}{3}$ in., rigid, midrib very strong, bright green, shining. *Flowers* $\frac{3}{4}$ in. diam., bracteate by the 2 upper pairs of leaves. *Calyx* truncate, not thickened at the base; sepals $\frac{1}{5}$ in., nerves very strong, approximate. *Petals* $\frac{1}{2}$ in. long, persistent, white, shortly clawed. *Filaments* slender. *Styles* 3, slender. *Capsule* apparently never fertilized, small, subglobose, 6-valved.

10. **A. pulvinata,** *Edgew.;* densely tufted, branches densely leafy, leaves short subulate from a scarious sheathing base semi-cylindric mucronate margin not thickened strongly ciliate, midrib usually obsolete, flowers sessile, sepals ovate-lanceolate subacute with 3 close-set nerves in the axis much smaller than the obovate petals.

Tibetan region of the Sikkim Himalaya, alt. 15–18,000 ft., *J. D. H.*

Forming small subglobose densely compacted subsquarrose tufts; branches with the leaves on $\frac{1}{4}$–$\frac{1}{3}$ in. diam., pale green. *Leaves* spreading and recurved, $\frac{1}{8}$–$\frac{1}{6}$ in., very strongly ciliate, almost fimbriate towards the base, flat above, back convex up to the tip, which is abruptly mucronate. *Flowers* $\frac{1}{4}$ in. diam., not bracteate by the enlarged upper leaves (as in *A. monticola*). *Calyx* rounded and thickened at the base: sepals with hard scarious margins, about half as large as the petals. *Disk-glands* distinct. *Filaments* slender. *Styles* 3, slender. *Capsule* ovoid, about $\frac{1}{3}$ in., shorter than the sepals; 6-valved. *Seeds* obovate-reniform, nearly smooth, pale.

11. **A. oreophila,** *Hook. f.;* nearly glabrous, densely tufted, stems short densely leafy, leaves spreading and recurved rigid narrowly linear-subulate from a broad sheathing base semi-cylindric acute margins not thickened quite glabrous, midrib obsolete, flowers very shortly pedicelled, sepals nearly orbicular concave nerveless half as long as the narrow obovate-spathulate petals.

Tibetan region of the Sikkim Himalaya, alt. 18,000 ft., *J. D. H.*

Forming small subglobose densely compacted tufts; branches with the leaves $\frac{1}{2}$–$\frac{3}{4}$ in. diam. *Leaves* nearly $\frac{1}{2}$ in. long, spreading, nearly flat above, convex to the tip beneath; uppermost pair short, bract-like, ciliolate. *Flowers* $\frac{1}{4}$ in. diam., solitary; pedicel shorter than the calyx, stout, puberulous *Calyx* rounded and somewhat thickened at the base; sepals coriaceous, ciliolate. *Petals* very narrow, tip rounded. *Filaments* slender. *Disk glands* prominent. *Styles* short. *Capsule* broadly ovoid, obtuse, rather exceeding the sepals, coriaceous, 6-valved to the base. *Seeds* ear-shaped.

14. **A. globiflora,** *Wall. Cat.* 639; densely tufted, stems short pubescent densely leafy, leaves spreading subulate-lanceolate pungent from a narrow membranous base concave 1-nerved, margin scaberulous, flowers globose,

pedicels short pubescent with several pairs of ovate pungent bracts, sepals orbicular-oblong palmately veined rather shorter than the orbicular-ovate petals. *Fenzl in Ann. Mus. Wien.* i. 60, t. 7. Cherleria grandiflora, *Don Prodr.* 214.

Alpine region of the NIPAL HIMALAYA, at Gosain-than, *Wallich.*

Forming small compact hemispherical tufts; roots long, fusiform. *Stems* 1–2 in. *Leaves* 3 in., rigid, base ciliate. *Flowers* $\frac{1}{2}$ in. diam., peduncle about as long, with 2–3 pairs of concave bracts. *Calyx* rounded at the base; sepals membranous, margins very thin, erose. *Petals* retuse. *Filaments* very rigid, subulate, cohering into an annular disk at the base. *Ovary* spherical; styles 2–3, short. *Capsule* much shorter than the sepals, membranous, 6-valved.—Don describes the flowers as rose-coloured, which we cannot affirm, and the stigmas as capitate, which is not the case, nor do we find the capsule to be 3-celled, as Don says it is.

13. **A. densissima,** *Wall. Cat.* 640; densely tufted, stems clothed with the imbricating leaf-bases, leaves recurved subulate-lanceolate from a narrow base pungent concave nerveless keeled below, margin quite smooth, flowers axillary solitary shortly pedicelled, bracts elliptic concave mucronate, sepals ovate half as long as the very narrow petals. *Fenzl in Mus. Wien.* i. 60, t. 7. Cherleria juniperina, *Don Prodr.* 214.

Alpine? region of the NIPAL HIMALAYA, Gosain-than, *Wallich.*

Forming large compact tufts; roots long, woody. *Stems* crowded, 3–4 in., densely leafy, rigid, fragile. Leaves $\frac{1}{4}$–$\frac{1}{3}$ in., almost deflexed, shining. *Flowers* very small. *Sepals* subacute, $\frac{1}{10}$ in. long. *Petals* linear-spathulate. *Capsule* globose.

SECT. IV. **Euthalia.** Lax or tufted, usually perennial. *Leaves* ovate or oblong, broad, never subulate. *Flowers* cymose or solitary. *Disk* usually conspicuous. *Capsule* 6-valved. *Seeds* numerous, rarely few.

* *Cymes few- or many- rarely* 1-*flowered.*

14. **A. serpyllifolia,** *Linn.*; annual, stem pubescent all round excessively branched, branches decumbent or suberect, leaves subsessile ovate acuminate 1–3-nerved ciliate, cymes many-flowered, bracts leafy, sepals 3–5-ribbed pubescent. *Boiss. Fl. Orient.* i. 701; *Wall. Cat.* 637. A. Wallichiana, *Seringe in Wall. Cat.* 638.

SUBTROPICAL and TEMPERATE HIMALAYA, from Nipal to Kashmir; ROHILKUND and the PANJAB, alt. 1–11,000 ft.; WESTERN TIBET, alt. 11–13,000 ft., *T. Thomson.*—DISTRIB. Affghanistan, Temp. Europe and Asia.

Branching from the root, many-flowered; branches 2–10 in., slender, dichotomously branched, leafy, hairs often recurved. *Leaves* $\frac{1}{4}$–$\frac{1}{3}$ in., rather rigid. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in. diam.; pedicels slender, strict, erect in flower, erect or spreading in fruit. *Sepals* ovate-lanceolate much exceeding the petals. *Capsule* 6-valved, ovoid, about as long as the sepals. *Seeds* tubercled.

15. **A. neelgerrensis,** *Wight & Arn. Prodr.* 43; annual, stem pubescent on one side much branched, branches decumbent, leaves subsessile elliptic or obovate obtuse or mucronulate 1-nerved ciliate, cymes few- or many-flowered, bracts leafy, sepals ovate acute 1-nerved, nerve pubescent.

NORTH-WEST HIMALAYA, alt. 5–10,000 ft., from Jamu to Kashmir, *Jacquemont,* &c. NILGHIRI MTS., *Wight,* &c.

Very similar to *A. serpyllifolia*, but of laxer habit, leaves more elliptic often petiolate sometimes obovate, branches chiefly hairy on one side, sepals usually broader and seeds less tubercled, but these characters are far from satisfactory.—Wight and Arnott describe the petals as longer than the sepals, which is not a constant character, and the styles as varying from 2–4.

16. **A. orbiculata,** *Royle mss.;* biennial or perennial?, branches very slender nearly glabrous decumbent, leaves sessile or shortly petioled orbicular or elliptic obtuse or apiculate 1-nerved, petiole ciliate, sepals ovate or lanceolate 1-nerved glabrous.

TEMPERATE HIMALAYA, from Bhotan, *Griffith*, and Sikkim, alt. 8–13,000 ft., to Kashmir, alt. 5–8000 ft.

Much more slender and less dichotomously branched than *A. serpyllifolia*, to which it is closely allied. *Branches* 2–10 in., thinly pubescent chiefly on one side. *Leaves* ⅛–¼ in., nearly glabrous. *Flowers* solitary or in few-flowered cymes. *Sepals* about ⅛ in., nerve often faint. *Petals* shorter than the sepals. *Seeds* many, smooth.—Apparently very near the West Asiatic *A. rotundifolia*, M. Bieb. (Boiss. Fl. Orient. i. 700), but the branches do not root, and the cymes are much fewer-flowered.

** *Flowers solitary.—Usually small tufted large-flowered alpine species.*

17. **A. ciliolata,** *Edgew.;* perennial, hairy, eglandular, laxly tufted, stems short leafy pubescent, leaves ovate or oblong acute cuspidate or acuminate nerveless fringed with long flexuous jointed hairs, flowers large solitary sessile or shortly pedicelled, sepals lanceolate acute ciliate shorter than the broadly obovate white petals.

SIKKIM HIMALAYA; alt. 15–17,000 ft., *J. D. H.*

Perennial, forming rather lax patches; roots fibrous. *Stems* matted, 2–3 in., with 2 obscure lines of hairs. *Leaves* spreading, ¼ in., sometimes elliptic, rather thick, obscurely 1-nerved, shining when old, margin obscurely thickened, hairs brown when dry, sometimes scattered over the surfaces, but chiefly confined to the margin. *Flowers* nearly ½ in. diam.; pedicels shorter than the leaves, very pubescent, ebracteate. *Calyx* rather rounded at the base; sepals of the texture of the leaves, edges hardly membranous, nerve obscure. *Petals* with rounded tips. *Filaments* subulate, flattened, connate at the base. *Styles* 3, slender. *Capsule* imperfect, small, globose, 6-valved.

18. **A. glanduligera,** *Edgew.;* densely glandular-pubescent, stems short laxly tufted suberect, leaves lax ovate or elliptic-oblong acute or acuminate flat, nerves obscure, flowers solitary pedicelled terminal erect or inclined, calyx rounded at the base, sepals spreading and recurved linear acute or obtuse glandular much smaller than the obovate rosy petals, capsule 6-valved shorter than the sepals.

ALPINE HIMALAYA; Kashmir, *Falconer;* Barji Kang pass, Kumaon, alt. 14,500 ft., *Strach. & Wint.;* interior of Sikkim, alt. 14–18,000 ft., *J. D. H.*

Allied to *A. ciliolata*, and of the same habit, but smaller and densely glandular-pubescent, without the long flexuous articulate hairs of that plant, having also much smaller flowers. *Stems* numerous from the root, 1–2 in., rather stout shining and glabrous below, laxly leafy. *Leaves* ⅙–¼ in., pale green, glandular on both surfaces, soft, opaque, margins hardly thickened. *Flowers* ⅓–½ in. diam.; pedicel usually shorter, slender. *Calyx* thickened at the base; sepals with membranous margins. *Filaments* flattened and united at the base in a glandular ring. *Styles* 3. *Capsule* membranous, few-seeded. *Seeds* pale.

19. **A. Stracheyi,** *Edgew.;* quite glabrous, stems short laxly tufted suberect, leaves lax narrow linear-oblong acute or acuminate flat, nerves obscure, flowers solitary pedicelled terminal erect or inclined, sepals suberect lanceolate acuminate smaller than the obovate petals, capsule 6-valved shorter than the sepals.

WESTERN TIBET, north of Kumaon, near Rakas Tal, alt. 15,500 ft., *Strach. & Winterb.;* Ladak, *Stewart.*

This belongs to the same group as *A. glanduligera* and *ciliolata*, and may be recognised by being perfectly glabrous. *Stems* 1–2 in., ascending, simple. *Leaves* fleshy,

¼–⅓ in., very pale when dry, tip acute rather cartilaginous, margins not thickened, midrib very obscure. *Flower* ½–¾ in. diam.; pedicel short, stout, ebracteate. *Sepals* coriaceous. *Petals* apparently white. *Seeds* small, somewhat ear-shaped, pale, opaque, nearly smooth.

20. **A. melandryoides,** *Edgew.;* glandular-pubescent, stems laxly tufted suberect, leaves lax oblong-elliptic or oblong-lanceolate obtuse coriaceous 1-nerved, flowers terminal solitary pedicelled nodding, calyx truncate at the base, sepals erecto-recurved obtuse glandular much shorter than the linear rose-coloured petals, capsule 4–6-valved exceeding the calyx.

SIKKIM HIMALAYA, alt. 14–18,000 ft., *J. D. H.*

Perennial; roots slender fibrous. *Stem* 2–4 in. long, laxly fascicled, branched from the base; branches cylindric, erect or ascending, simple or sparingly divided, naked below. *Leaves* ⅓–⅔ in., in rather distant pairs, sessile, dull green or purplish, glandular on both surfaces, almost fleshy. *Flowers* solitary, terminal, rarely axillary, ¾–1 in. diam., pedicel short and curved in flower, densely glandular, much elongated strict and erect in fruit. *Calyx* subcampanulate, thickened at the base; sepals ⅓ in. long, narrow, green, nerveless, margins not membranous. *Petals* very variable, sometimes ¾ in. long, tip rounded. *Filaments* slender. *Disk-glands* inconspicuous. *Styles* 2–3. *Capsule* ovoid, exceeding the calyx, 4- or 6-valved, membranous. *Seeds* large, irregularly formed, testa pale spongy (young seeds orbicular and broadly winged).—A very curious plant, with something of the habit of *Stellaria cerastioides*, very glandular, with pink or purplish flowers. It unites this section with the following. The testa is very lax and appears in the immature seed as a broad white wing around the undeveloped nucleus.

SECT. V. **Lepyrodiclis,** *Fenzl* (gen.). Flaccid usually tall herbs. *Leaves* broad, flat. *Petals* often erose or lacerate. *Flowers* cymose. *Disk* annular or obsolete. *Styles* 2, rarely 3. *Capsules* 2–6-valved, membranous, 1–6-seeded. *Seeds* with a thick or tubercled testa.—This section is usually upheld as a genus and described as having a distinct disk, 2–3-valved capsule, and only 2–4 seeds, but we find none of these characters to hold good.

21. **A. holosteoides,** *Edgew.;* a tall slender flaccid glabrous or puberulous much branched herb, leaves linear or linear-oblong from a broad sessile cordate base acute or acuminate, cymes few-flowered, pedicels slender divaricate, sepals obtuse and petals very variable, tip retuse not lacerate, capsule 2–6-valved 1–6-seeded, seeds large tubercled. Lepyrodiclis holosteoides, *Fenzl in Ledeb. Fl. Ross.* i. 359; *Boiss. Fl. Orient.* i. 686. Gouffeia crassiuscula, *Camb. in Jacq. Voy. Bot.* t. 30.

WESTERN TEMPERATE HIMALAYA and WESTERN TIBET, from Kumaon to Kashmir, alt. 7–12,000 ft., *Jacquemont*, &c.—DISTRIB. Affghanistan, Soongaria, and Westward to Asia Minor.

Whole plant glabrous or glandular-pubescent. *Stem* 2–3 ft., much dichotomously branched, shining and striate when dry. *Leaves* 1–3 in., spreading, midrib and very oblique nerves exceedingly slender. *Cymes* pedicelled. *Flowers* ¼–½ in. diam., white, nodding; pedicels ⅙–½ in, ebracteate. *Calyx* not thickened at the base; sepals from linear-lanceolate to broadly ovate-oblong, green with membranous edges, glabrous or very hairy and glandular at the back. *Petals* equalling or exceeding the sepals, linear-spathulate or broadly obovate, notched or retuse. *Filaments* with broad flattened free bases. *Disk* 0. *Styles* 2–3, filiform, elongate. *Capsule* subglobose, shorter than the calyx, very membranous, variable in size, 2–6-valved to the base. *Seeds* on tumid funicles, variable in number and size, turgid, red brown or blackish, with concentric rows of acute tubercles; cotyledons long flattened, radicle short.—We do not find the subhypogynous gland described by Fenzl (in Ledebour, l.c.), nor any disk in this and the two following species. A most variable plant, especially in the sepals petals capsule and number of seeds.

22. **A. Benthami,** *Edgew.*; tall, slender, flaccid, glandular-pilose, much branched, leaves sessile ovate acute hairy on both surfaces, cymes few- or many-flowered, pedicels slender divaricate, sepals oblong- or linear-lanceolate, petals obovate-spathulate lacerate, capsule 2–6-valved. Adenostemma glandulosum, *Benth. in Wall. Cat.* 645.

TEMPERATE HIMALAYA; Kumaon, *Blinkworth;* Sikkim, alt. 10–12,000 ft., *J. D. H.*
Stems 2–3 ft. high, clothed with spreading jointed glandular hairs. *Leaves* ¾–1½ in., the lower petioled, midrib indistinct, nerves obsolete, margins ciliate. *Cymes* peduncled. *Flowers* ½ in. diam., nodding; pedicels slender, deflexed in fruit, ebracteate. *Calyx* not thickened at the base; sepals very glandular, erect and recurved, green with narrow membranous margins. *Petals* longer than the calyx, white. *Disk* obsolete. *Filaments* slender, dilated below, but hardly connate. *Styles* usually 2, not so capillary as in *A. holosteoides*. *Capsule* usually 4-valved, smaller than the calyx. *Seeds* few, with a thick spongy opaque hardly tubercled testa.

23. **A. debilis,** *Hook. f.*; stems solitary or laxly tufted flaccid glandular-pilose sparingly branched or simple, leaves sessile elliptic-ovate obtuse hairy especially above, flowers solitary terminal or in few-flowered cymes, pedicels divaricate, sepals linear-lanceolate petals obovate, tip erose.

ALPINE SIKKIM HIMALAYA; alt. 14–16,000 ft. *J. D. H.*
Very like a small form of *A. Benthami,* but smaller in all its parts; leaves more obtuse; flowers not ¼ in. diam.; petals not lacerate and broader, merely irregularly toothed at the tip; filaments much shorter inserted on an evident thickened annular disk.—Small states come very near *A. glanduligera,* which however may at once be distinguished by the large flower acute leaves and the petals.

24. **A. tenera,** *Edgew.*; glabrous or pubescent, stems filiform flaccid intricately branched, leaves long-petioled elliptic or ovate- or oblong-lanceolate acute, flowers small axillary, pedicels capillary, sepals ovate-oblong or lanceolate acute half as long as the linear quite entire petals. Lepyrodiclis tenera, *Boiss. Fl. Orient.* i. 669.

WESTERN TEMPERATE HIMALAYA; Kishtwar and Banahal, alt. 6–8000 ft., *T. Thomson.*—DISTRIB. Affghanistan.
A very slender intricately tufted annual, with stems 2–3 ft. long. *Leaves* scattered, membranous, ½–¾ in., petiole often longer than the blade, capillary. *Flowers* usually axillary, ⅙–¼ in. diam.; pedicels divaricate, ½–1 in. *Sepals* variable in form, erect and conniving in flower, then spreading, ciliate at the back. *Petals* white, gradually dilated upwards. *Filaments* very slender, hardly united at the base. *Disk* obsolete. *Capsule* globose, smaller than the sepals, usually 4-valved and 4-seeded. *Seeds* subglobose, with concentric series of acute tubercles.—In the Affghan specimens the petals appear lacerate, but it is exceedingly difficult to lay them out after being dried without rupturing the apices.

14. SAGINA, Linn.

Small annual or perennial herbs. *Leaves* subulate, connate at the base; stipules 0. *Flowers* solitary, small, axillary and terminal, pedicelled. *Sepals* 4–5. *Petals* 4–5, entire or 0. *Stamens* 4, 5, 8, 10, perigynous. *Ovary* 1-celled; styles 4–5 (and valves of capsule) opposite the sepals; ovules numerous. *Capsule* 4–5-valved to the base. *Seeds* reniform.—DISTRIB. Temperate regions; species 8.

1. **S. procumbens,** *Linn.*; perennial, stems many tufted, primary shoots flowerless, lateral slender with fascicled usually procumbent and rooting branches, sepals 4–5 spreading in fruit, petals very small. *Boiss. Fl. Orient.* i. 662.

TEMPERATE and ALPINE HIMALAYA, and WESTERN TIBET, alt. 7–14,000 ft., ascending to 16,000 ft. in Sikkim.—DISTRIB. N. and S. Temperate Zones.

Whole plant 1–6 in., bright green. *Leaves* glabrous or ciliate, usually mucronate. *Flowers* globose, green, rarely 5-merous, ⅛ in. diam., pedicels erect or curved at the tip. *Sepals* obtuse. *Capsule* a little longer than the sepals.

VAR. *pentamera;* flowers pentamerous.—This may be referable to *S. Linnæi*, Presl. (*saxatilis*, Wimmer), but differs in the short petals.

15. THYLACOSPERMUM, Fenzl.

A most densely tufted herb. *Leaves* minute, most densely imbricate, short, acute; stipules 0. *Flowers* solitary, sessile in the tips of the branches. *Calyx-tube* obconic, 4–5-lobed, lobes suberect. *Petals* 4–5, small, obovate-spathulate. *Stamens* 8–10, inserted on the edge of a disk lining the calyx-tube. *Ovary* 1-celled; styles 2–3, filiform; ovules few. *Capsule* coriaceous, spherical, 4–6-valved. *Seeds* few, large, with a soft loose cellular testa.

1. **T. rupifragrum,** *Schrenk.* Periandra cæspitosa, *Cambess. in Jacq. Voy. Bot.* 27 and t. 29 (Flourensia). Bryomorpha rupifraga, *Kar. & Kir. Enum. Pl. Soong.* Arenaria rupicola, *Fenzl in Ledeb. Fl. Ross.* i. 780.

ALPINE WESTERN TIBET, alt. 15–18,000 ft., *Jacquemont*, &c.—DISTRIB. Soongaria.

Forming large hemispheric cushions a foot across and more, quite glabrous. *Leaves* $\frac{1}{6}$–$\frac{1}{12}$ in., suberect, or spreading most densely 5-fariously imbricate, ovate, acuminate, pungent, shining, nerveless, back convex, concave above with thickened margins. *Flowers* $\frac{1}{10}$ in. diam. *Capsules* shining, 4- or irregularly 6-valved. *Seeds* very large, irregularly compressed, almost white.—A very singular plant in habit, closely allied to *Arenaria densissima*, &c.

16. SPERGULA, Linn.

Annual or perennial herbs, with forked or fascicled branches. *Leaves* opposite, often with leafy buds in their axils, whence the foliage appears to be whorled; stipules small, scarious. *Flowers* in peduncled panicled cymes. *Sepals* 5. *Petals* 5, entire. *Stamens* 5 or 10, rarely fewer, inserted on a perigynous disk. *Ovary* 1-celled; styles 3 or 5, ovules many. *Capsule* with 3 or 5 entire valves. *Seeds* compressed, margined or winged.—DISTRIB. Weeds of cultivated grounds; species 2–3.

The valves of the capsule are described as opposite to the sepals, but this does not hold good where there are but 3 valves and 5 sepals.

* Leaves apparently whorled.

1. **S. arvensis,** *Linn.;* green, leaves in false whorls linear-subulate ½-terete grooved beneath rather fleshy, petals obtuse white, seeds keeled or narrowly winged granulate or papillose. *Boiss. Fl. Orient.* i. 731.

Cultivated fields in various cool parts of INDIA; and throughout the Northern hemisphere.

Pubescent or glandular. *Stems* ½–2 ft., branched from the root, geniculate. *Leaves* ½–2 in., slender, spreading. *Flowers* $\frac{1}{6}$–¼ in. diam., subumbellate; pedicels slender, spreading or deflexed. *Sepals* ovate, obtuse. *Petals* white. *Capsule* subglobose, shining. *Seeds* black.

2. **S. pentandra,** *Linn.;* glaucous, leaves in false whorls linear-subulate terete not grooved beneath, petals lanceolate-acute white, seeds plano-compressed smooth, wing often as broad as the striate nucleus. *Boiss. Fl. Orient.* i. 731. Arenaria flaccida, *Roxb. Fl. Ind.* ii. 447.

In the same situations as *S. arvensis*, and with the same distribution.

I am unable to distinguish this in a dried state from the preceding. I find 3 styles very frequently, as described by Roxburgh, which does away with the difference between the genera *Spergula* and *Spergularia*, to which latter the following species belongs.

** Leaves opposite.

3. **S. rubra,** *Linn.* (Arenaria); suberect or prostrate, glandular-pubescent, leaves simply opposite linear flat, stipules cleft, sepals lanceolate-obtuse, petals pink or white, seeds wingless scabrid, margin somewhat thickened. Spergularia rubra, *St. Hil.*; *Boiss. Fl. Orient.* i. 732.

Plains of the PANJAB, *Edgeworth*, &c.—DISTRIB. N. and W. Asia, Europe.

Root fusiform, annual. *Stems* much branched from the base, 4–8 in. *Leaves* $\frac{1}{2}$–1 in., fleshy; stipules broad, silvery. *Flowers* $\frac{1}{4}$–$\frac{1}{3}$ in. diam., subglobose; pedicels divaricate or deflexed. *Sepals* green, with membranous borders, obtuse. *Petals* obovate, obtuse; shorter than the sepals. *Stamens* 5 or 10. *Styles* 3. *Capsule* ovoid, longer than the sepals. *Seeds* pale-brown, irregularly reniform or pyriform. This is usually referred to another genus *Spergularia*, Persoon (*Lepigonum*, Fries), which differs from *Spergula* in having only 3 styles; but the prevalence of 3 styles in the typical species of *Spergula* in India, renders this character valueless as a generic one.

17. DRYMARIA, Willd.

Diffuse or suberect dichotomously branching herbs. *Leaves* opposite, flat; stipules small, often fugacious. *Flowers* axillary or terminal, solitary or cymose. *Sepals* 5, herbaceous. *Petals* 5, 2–6-fid. *Stamens* 5, rarely fewer, slightly perigynous. *Ovary* 1-celled; style 3-fid; ovules few or numerous. *Capsule* 3-valved. *Seeds* globose, reniform or compressed, hilum lateral, embryo curved.—DISTRIB. Species 16, all Tropical American except the following and an Australian species.

1. **D. cordata,** *Willd.*; glabrous, leaves ovate-cordate elliptic or orbicular petioled, petals 2-lobed shorter than the sepals. *Wight & Arn. Prodr.* 359. D. extensa, *Wall. Cat.* 647. Cerastium cordifolium, *Roxb. Fl. Ind.* ii. 458.

Tropical and subtropical INDIA and CEYLON, extending westwards to the Panjab and ascending the Himalaya to 7000 ft. in Sikkim.—DISTRIB. Tropical Asia, Africa, and America.

A diffuse glabrous shrub, branched from the base; branches 1–3 ft., slender. *Leaves* 3–5-nerved from the base, mucronate; petioles variable; stipule of several bristles. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., in axillary and terminal cymes; pedicels slender; bracts with membranous edges. *Calyx* obconic at the very base; sepals oblong, with 3 strong nerves, and membranous margins. *Petals* 2-lobed to below the middle, lobes narrow not exceeding the sepals. *Stamens* 3–5. *Style* short; ovules 3 or more. *Capsule* ovoid, 3-gonous, shortly pedicelled, 3-valved to the base; 1-∞-seeded. *Seeds* orbicular, compressed, muricate.

18. POLYCARPON, Linn.

Diffuse or dichotomously branched, glabrous or pubescent herbs. *Leaves* flat, opposite, appearing whorled from the presence of axillary fascicles of leaves; stipules scarious. *Flowers* small, in crowded many-flowered cymes with scarious bracts. *Sepals* 5, keeled. *Petals* 5, small, hyaline, entire or toothed. *Stamens* 3–5. *Ovary* 1-celled; style short, 3-fid; ovules numerous. *Seeds* ovoid, hilum subbasal; embryo almost straight or incurved, cotyledons incumbent or oblique.—DISTRIB. Species about 6, natives of various tropical and warm climates.

1. **P. Lœflingiæ,** *Benth. & Hook. f. Gen. Pl.* i. 153, *in note;* glabrous or more or less pubescent, leaves cuneate linear oblong or spathulate, cymes terminal or in the forks, petals linear truncate tip toothed. P. depressa, *DC. Prodr.* iii. 375. P. lanuginosa, *Wall. Cat.* 1515 b *and ?* P. Benthamii, 1514. Lœflingia indica, *Retz. Obs.* 38; *Roxb. Fl. Ind.* i. 165: Pharnaceum depressum, *Linn. Mant.* n. 564. Hapalosa Lœflingiæ, *Wall. Cat.* 6962; *Wight & Arn. Prodr.* 358.

Throughout the hotter parts of INDIA, in fields and waste places.—DISTRIB. Tropical Asia and Africa.

A weed, erect or diffuse; branches 6–10 in. *Leaves* ¼–¾ in., acute or obtuse. *Cymes* fascicled or panicled. *Flowers* ⅛ in. diam. *Sepals* subequal, obtusely keeled. *Petals* entire or notched. *Seeds* subcylindric, hilum lateral and subbasal; embryo nearly straight.

19. POLYCARPÆA, Lamk.

Annual or perennial, usually erect herbs. *Leaves* flat, opposite, or appearing whorled from the presence of axillary fascicles of leaves; stipules scarious. *Flowers* numerous, in effuse or contracted or capitate cymes. *Sepals* 5, scarious and often coloured, rarely scarious at the margins only. *Petals* 5, entire 2-toothed or with the margins erose. *Stamens* 5, subperigynous, free or cohering together and with the petals into a tube. *Ovary* 1-celled; style slender 3-fid or 3-dentate; ovules numerous. *Capsule* 3-valved. *Seeds* obovoid or compressed. *Embryo* curved, rarely straight. —DISTRIB. Species about 24, natives of warm climates.

1. **P. corymbosa,** *Lamk. Ill.* n. 2798; hoary tomentose or glabrescent, leaves narrow linear or subulate pseudo-verticillate, stipules lanceolate or subulate, cymes terminal, sepals lanceolate very acute much exceeding the capsules. *DC. Prodr.* iii. 374; *Wall. Cat.* 1571; *Wt. Ic.* t. 712; *W. & A. Prodr.* 358. P. spadicea, *Lamk. DC. l.c.* 374; *W. & A.* 357; *Wall. Cat.* 1512 b; *Wt. in Hook. Comp. Bot. Mag.* ii. t. 6. P. densiflora, *Wall. Cat.* 1513. P. indica, *Lamk. Encycl.* v. 483. Paronychia subulata, *Lamk. Encycl.* v. 25. Achyranthes corymbosa, *Linn.; Willd.* Celosia corymbosa, *Willd. ? Roxb. Fl. Ind.* i. 681. Mollia spadicea *and* corymbosa, *Willd. ? Spreng. Syst.* i. 795. Lahaya spadicea *and* corymbosa, *Schult. ? Syst.* v. 405; *Burm. Zeyl.* t. 65, f. 2.—*Rheede Hort. Mal.* t. 66.

WESTERN PENINSULA, and CEYLON, CENTRAL and N.W. INDIA, and SINDH, ascending the WESTERN HIMALAYA to 7000 ft.; BIRMA, *Wallich.*—DISTRIB. Tropical Asia, Africa, Australia, and America.

An erect or decumbent annual or perennial herb, 6–12 in. high, much dichotomously branched. *Leaves* ⅓–1 in., acuminate acute or obtuse, much exceeding the stipules. *Flowers* ⅙ in. diam., in dense excessively branched silvery cymes. *Sepals* scarious, white or coloured, glabrous or pilose, much exceeding the petals and the capsule.—Dr. Wight found it impossible (Ill. ii. 44) to separate *P. spadicea* from *P. corymbosa*, even as a well marked variety, and we may add that we have equally failed to discriminate either those species or their synonymy.—The following seems to be a well-marked form, to which the name *spadicea* might have been applied with propriety.

VAR. *aurea*, Wight Ill. ii. 44, t. 110; smaller, densely tomentose, excessively branched, flowers much smaller highly-coloured.

2. **P. diffusa,** *Wight & Arn. in Ann. Nat. Hist.* iii. 91; glabrous, slender, leaves narrow-linear or subulate pseudo-verticillate, sepals ovate-lanceolate very acute not much exceeding the petals or capsule. *Wight Ill.* ii. 44.

WESTERN PENINSULA; near Tuticoreen, *Wight.*

Branches 6–18 in. high. *Leaves* obtuse, $\frac{1}{4}$–$\frac{1}{2}$ in.; stipules lanceolate. *Cymes* puberulous, lax, very many-flowered. *Flowers* $\frac{1}{12}$ in. long.

3. **P. spicata,** *Wight & Arn. in Ann. Nat. Hist.* iii. 91; annual, glabrous, leaves obovate-spathulate radical rosulate, cymes densely fascicled or semiumbellate, flowers subspicate, sepals lanceolate or ovate-lanceolate acute much exceeding the petals and capsule. P. staticæformis, *Hochst. & Steud.*

Western Peninsula, at Tuticoreen, *Wight;* Sindh, *Stocks.*—Distrib. Arabia, Egypt, N. Australia.

A small herb 2–5 in. high; branches strict, filiform, erecto-patent from the root, bearing tufts of leaves and umbelled cymes. *Leaves* petioled, $\frac{1}{4}$–$\frac{1}{2}$ in., rather fleshy, nerveless; stipules scarious, lacerate. *Cymes* $\frac{1}{2}$ in. diam., long peduncled. *Flowers* subsecund, crowded, $\frac{1}{8}$ in. long, bracts and sepals acute, scarious, white, with a highly coloured broad herbaceous midrib. *Petals* very small, oblong, obtuse. *Capsule* rather more than half the length of the sepals. *Seeds* shining.

Order XIX. **PORTULACEÆ.** (By W. T. Thiselton Dyer, F.L.S.)

Herbs, rarely undershrubs. *Leaves* opposite or alternate, entire; nodes with scarious or hairy appendages, rarely naked. *Inflorescence* various. *Sepals* 2, imbricate. *Petals* 4–5, hypogynous or perigynous, free (or united below), fugacious. *Stamens* 4–∞, inserted with (rarely upon) the petals, filaments slender; anthers 2-celled. *Ovary* free, or $\frac{1}{2}$-inferior, 1-celled; style 2–8-fid, divisions stigmatose; ovules 2–∞, on basal funicles or a central column, amphitropal. *Capsule* with transverse or 2–3-valvular dehiscence. *Seeds* 1–∞, compressed; embryo curved round a mealy albumen.—Distrib. Cosmopolitan, chiefly American; genera 15, species about 125.

Ovary half-adnate . . . . 1. Portulaca.
Ovary free . . . . 2. Talinum.

1. **PORTULACA,** Linn.

Diffuse, usually succulent, annual or perennial herbs. *Leaves* with scaly or hairy nodal appendages. *Flowers* terminal, surrounded by a whorl of leaves, solitary or clustered. *Sepals* connate below, the free part deciduous. *Petals* 4–6, perigynous or epipetalous. *Ovary* $\frac{1}{2}$-inferior; style 3–8-fid; ovules ∞. *Capsule* crustaceous, dehiscing transversely. *Seeds* ∞, reniform.—Distrib. Tropical regions, chiefly American; one or two are cosmopolitan weeds extending to temperate regions; species 16.

* Leaves flat.

1. **P. oleracea,** *Linn.;* nodal appendages scarious minute or 0, leaves cuneate-oblong. *Roxb. Fl. Ind.* ii. 463; *W. & A. Prodr.* 356. P. lævis, *Ham. in Wall. Cat.* 6841. P. suffruticosa, *Thw. Enum.* 24 (*not of Wight*).

Throughout India, ascending to 5000 ft. in the Himalayas.—Distrib. All warm climates.

An annual usually prostrate herb, $\frac{1}{2}$–1 ft., subsucculent and glabrous. *Leaves* $\frac{1}{4}$–$1\frac{1}{2}$ in., rounded-truncate; petiole very short. *Inflorescence* of few-flowered terminal heads, either solitary, or in dichotomous cymes. *Flowers* sessile, with a few ovate, pointed, scarious scales. *Petals* 5, about equalling the sepals, yellow. *Stamens* 8–12. *Style* 3–8-fid. *Seeds* tubercled-punctate.—An excellent salad.

Var. *erecta;* erect, leaves spathulate-linear brighter green; P. oleracea, *var.* sylvestris, *Hb. Royle* (*not of DC.*).—N.W. India.

2. **P. Wightiana,** *Wall. Cat.* 6845; nodal appendages whorled scarious, leaves oblong or ovate-lanceolate. *W. & A. Prodr.* 356.

WESTERN PENINSULA; in the Carnatic, and CEYLON.
Stems much branched, prostrate, stunted; the approximate joints naked below, clothed with scarious appendages, and sparingly leafy above. *Leaves* $\frac{1}{5}$ in., alternate, acute, margins recurved; nodal appendages about six in a whorl, equalling the leaves, imbricate, lanceolate, acute, persistent. *Flowers* terminal, solitary, sessile, surrounded by a few leaves and tufted appendages. *Sepals* about $\frac{1}{12}$ in., broadly ovate-lanceolate. *Petals* 5, obovate, with netted veins. *Stamens* 5 (or more?) shorter than the petals. *Style* filiform, 4-fid to $\frac{1}{3}$ its length. *Seeds* numerous, granulate.

3. **P. quadrifida,** *Linn.;* annual, nodal appendages pilose, leaves ovate or ovate-lanceolate. *Wight Ill.* ii. t. 109; *Wall. Cat.* 6843. P. meridiana, *Linn.; Roxb. Fl. Ind.* ii. 463. P. geniculata, *Royle Ill.* 221. Illecebrum verticillatum, *Burm. Ind.* 66; *Rheede Hort. Mal.* x. t. 31.

Throughout the warmer parts of INDIA and CEYLON.—DISTRIB. Tropical Asia and Africa.
Stems diffuse, filiform, rooting at the nodes. *Leaves* $\frac{1}{5}$–$\frac{1}{3}$ in., opposite, very shortly petioled; nodal appendages more or less copious. *Flowers* terminal, solitary. *Calyx-tube* $\frac{1}{2}$-immersed in the extremity of the axis, surrounded by a 4-leaved involucre and long silky hairs. *Petals* 4 (yellow). (*Stamens* 8–12.) *Style* filiform, 4-fid to the middle. *Seeds* minutely tubercled.—Stunted specimens have the habit of *Polygonum herniarioides* which has been mistaken for this species.

** Leaves terete.

4. **P. tuberosa,** *Roxb. Hort. Beng.* 91; *Fl. Ind.* ii. 464; perennial stems short spreading from a tuberous root. P. cristata, *Ham. and* pilosa, *Hb. Madr. in Wall. Cat.* 6844, *not of Linn.*

BEHAR, *Hamilton;* SINDH, *Stocks;* WESTERN PENINSULA; CEYLON.
Root 2–3 in, slightly fusiform, with a few branches towards the extremity, villous. *Stems* 2–3 in., spreading. *Leaves* $\frac{1}{2}$–$\frac{3}{5}$ in., alternate, fleshy, linear; nodal appendages $\frac{1}{6}$ in., of sparingly tufted brown hairs. *Flowers* (yellow) in small terminal clusters, surrounded by about 8 leaves and tufted hairs. *Stamens* 20–∞. Style filiform, 5-cleft. *Seeds* black, granular.—Closely allied to the Australian *P. napiformis*, F. Muell.

5. **P. suffruticosa,** *Wight in Wall. Cat.* 6842; annual, stems erect. *W. & A. Prodr.* 356.

WESTERN PENINSULA, *Wight.*
Root annual, woody, divided. *Stem* about 1 ft., subligneous at the base, breaking up into numerous ascending branches. *Leaves* about $\frac{1}{2}$ in., acute; nodal appendages setose, scanty, very short, brown. *Flowers* in small terminal clusters, surrounded by about 8 leaves, and setose appendages equalling about $\frac{1}{2}$ the base of the capsule. (*Stamens* about 16. *Style* 5-cleft to the middle, *W. & A.*). *Seeds* very small, with concentric rows of minute tubercles.—Allied to the tropical African *P. foliosa*, Ker, which differs chiefly in habit, from the production of lateral flower-bearing shoots overtopping the primary terminal heads.

2. **TALINUM,** Adans.

Succulent herbs or shrubs. *Leaves* flat, exstipulate. *Flowers* racemed or panicled. *Petals* 5, hypogynous. *Stamens* ∞. *Ovary* superior; style 3-fid; ovules ∞. *Capsule* globose or ovoid, 2–3-valved. *Seeds* subglobose or compressed, strophiolate.—DISTRIB. Warm countries throughout the world.

1. **T. cuneifolium,** *Willd.; Roxb. Fl. Ind.* ii. 465. T. indicum, *W. & A. Prodr.* 356; *Wall. Cat.* 6847.

NIPAL, *Wallich;* WESTERN PENINSULA, *Wight.*—DISTRIB. Arabia, Africa.

Stems shrubby, erect, striate. *Leaves* 1–2 in., cuneiform-obovate, uppermost mucronate. *Flowers* in a terminal subdichotomously branched panicle, with small acuminate membranous-edged bracts; pedicels decurved in fruit. *Petals* 4, purple. *Sepals* ¼ in. long, broadly ovate, margins membranous, rather obtuse. *Style* very short, 3-fid. *Capsule* globose, about ¼ in. diam.

ORDER XX. **TAMARISCINEÆ.** (By W. T. Thiselton Dyer, F.L.S.)

Undershrubs, bushes, or small trees. *Leaves* alternate, very minute, often scale-like, exstipulate, rarely sheathing, sometimes fleshy or impress-punctate. *Flowers* solitary or in spiked or panicled racemes, regular, rarely 1-sexual. *Sepals* and *petals* each 5, rarely 4, imbricate, free or connate below. *Stamens* 5–10–∞, inserted on the disk, free or connate below; anthers versatile. *Disk* hypogynous or subperigynous, 10-glandular. *Ovary* free, 1-celled, or imperfectly septate; styles 2–5, free or connate, or stigmas 3–5, sessile; ovules 2–∞ on each basal placenta, anatropous, raphe ventral, micropyle inferior. *Capsule* 3-valved. *Seeds* erect, plumed or winged; albumen floury, subfleshy or 0; embryo straight, cotyledons flat.—DISTRIB. Cold, temperate and hot regions, often in saline or sandy plains; genera 5, species about 40.

Stamens free, styles 3	1. TAMARIX.
Stamens connate, stigmas sessile	2. MYRICARIA.

1. **TAMARIX,** Linn.

Bushes or small trees. *Leaves* scale-like, amplexicaul or sheathing. *Inflorescence* of lateral or terminal spikes or dense racemes; flowers white or pink. *Stamens* 4, 5, 8 or 10; anthers apiculate. *Disk* more or less lobed from varying confluence of the glands. *Ovary* narrowed upwards; styles 3–4, short, dilated into the stigmas; placentas basal; ovules many. *Seeds* with a sessile plume, exalbuminous; embryo ovoid.—DISTRIB. Of the Order; species about 20.

* Stamens 5.

1. **T. gallica,** *Linn.;* leaves not sheathing smooth subulate or scale-like acute, disk 5-lobed.

Throughout INDIA from the N.W. HIMALAYA to BIRMA and CEYLON, near rivers and along the sea coast.—DISTRIB. W. and S. shores of Europe, N. and Tropical Africa, S. Asia.

A bush or small tree; branches slender. *Flowers* ⅛ in. diam., shortly pedicelled in slender panicled spike-like racemes. *Sepals* triangular-ovate, much shorter than the petals. Glands of *disk* more or less coalescing in pairs. *Ovary* sub-3-gonous, subsessile; styles 3, articulated to the ovary, slightly connate.—Divided into numerous species differing in minute and uncertain characters.

VAR. 1. *indica,* Willd. in Act. Nat. Cur. Berol. iv. 214 (sp.); usually green, branchlets divaricate, leaves semi-amplexicaul, lobes of the disk entire or nearly so. T. indica, *Kœn. ex Roxb. Fl. Ind.* ii. 100 (*excl. syn.*). T. gallica, *Wight Ill.* t. 24 A. T. epacroides, *Sm. in Rees Cycl.* T. articulata, *Wall. Cat.* 3756 *a and d.*—Common.

VAR. 2. *Pallasii,* Desv. in Ann. Sc. Nat. iv. 349 (sp.); glaucescent or glaucous, branchlets erect, leaves shortly decurrent, lobes of the disk deeply emarginate. *Boiss. Fl. Orient.* i. 773. T. ramosissima, *Ledeb. Ic. Fl. Ross.* t. 256.—Western Tibet, alt. 8–12,000 ft.

2. **T. salina,** *Dyer;* leaves cordiform subamplexicaul strongly impress-punctate.

WESTERN PANJAB; Salt Range at Caffir Kote and Esakhail, *Fleming.*

A glabrous glaucous shrub, with the habit of *T. passerinoides*, Del.; Boiss. Fl. Orient. i. 778. *Bracts* linear, equalling the flowers in length. *Stamens* equalling the ovary; filaments dilated at the base, confluent with the disk-glands. *Stigmas* sessile. *Capsule* not seen.

3. **T. dioica,** *Roxb. Hort. Beng.* 22; *Fl. Ind.* ii. 101; leaves sheathing, flowers diœcious in rather short dense peduncled spikes. *Griff. Notul.* iv. 465, ic. 577, f. 2; *Wall. Cat.* 1241; *W. & A. Prodr.* 40; *Boiss. Fl. Orient.* i. 777. T. articulata, *Wall. Cat.* 3756, b & c (*not of Vahl*).

From SINDH and the PANJAB to ASSAM, the WESTERN PENINSULA and BIRMA, near rivers and on the sea coast.

A small tree. *Branches* with drooping extremities; ultimate branchlets elongate, patent-fastigiate. *Leaves* glabrous, green, obliquely truncate and acuminate. *Spikes* panicled, 1–2 in., about equalling their peduncles. *Bracts* triangular, acuminate. *Flowers* ⅛ in. diam., pink. *Stamens* inserted in the notches of the 5-lobed disk; anthers purple.

4. **T. articulata,** *Vahl, Symb.* ii. 48, t. 32; hoary with impress-punctate glands, leaves sheathing, spikes lax usually sessile. *Boiss. Fl. Orient.* i. 777. T. orientalis, *Forsk. Descr.* 206. T. Pharas, *Ham. ex Wall. Cat.* 3758. Thuya aphylla, *Linn. Amœn. Acad.* iv. 295.

Abundant in SINDH and the PANJAB; often cultivated.—DISTRIB. Beluchistan and westward to Egypt and S. Africa.

A bush or coniferous-looking tree. *Branchlets* fastigiate, elongate, slender, cylindric, jointed. *Leaves* reduced to a very short sheath with a minute tooth. *Spikes* slender, more or less interrupted. *Bracts* sheathing, acute. *Flowers* ⅛ in diam., subsessile. *Stamens* inserted in alternate notches of the 10 lobed disk.—The Cape form is *T. usneoides*, E. Mey.

** Stamens 10. (*Pleiandræ*. Bge.)

5. **T. ericoides,** *Rottl. in Nov. Act. Nat. Cur. Berol.* iv. 214, t. 4; leaves impunctate sheathing-amplexicaul, glands of the disk separating the filaments. T. mucronata, *Smith in Rees Cycl.* T. tenacissima, *Ham. ex Wall. Cat.* 3757. Myricaria vaginata, *Desv. in Ann. Sc. Nat.* iv. 350. Trichaurus ericoides, *W. & A. Prodr.* 40; *Wight Ill.* t. 24 B; *Ic.* 22; *Camb. in Jacq. Voy. Bot.* 58, t. 70.

CENTRAL INDIA, BENGAL, the WESTERN PENINSULA and CEYLON.

A shrub; stems slender, branchlets fastigiate. *Leaves* minute, scale-like, ovate-lanceolate, acuminate. *Flowers* ¼ in. diam., pale rose-pink, in terminal racemes 4–6 in. *Stamens* not exceeding the petals, alternately long and short. *Capsule* ½ in.—Approaches *Myricaria* in habit.

6. **T. stricta,** *Boiss. Fl. Orient.* i. 778; hoary with impress-punctate glands, leaves closely sheathing, glands of the disk passing into the slightly dilated bases of the filaments.

SINDH, *Stocks*.—DISTRIB. Beluchistan.

Habit of *T. articulata*, Vahl, from which according to Boissier it is distinguished by the thicker branchlets more remote leaves and subsessile stigmas, besides the different number of stamens.

2. MYRICARIA, Desv.

Fastigiate shrubs. *Leaves* small, narrow, sessile, often crowded. *Inflorescence* of lateral or terminal spike-like racemes; flowers rose-pink. *Stamens* 10, alternately long and short, monadelphous. *Disk* almost obsolete. *Ovary* tapering with 3 sessile stigmas; placentas basal, very short, adnate to the middle of the valves; ovules many. *Seeds* exalbuminous with a usually stalked plume; embryo ovoid.—DISTRIB. Europe, Mid-Asia; known species 4?

1. **M. germanica,** *Desv. in Ann. Sc. Nat.* iv. 349; bracts ovate-lanceolate 3–4 times as long as the pedicels, sepals free lanceolate, stamens connate for half their length. M. bracteata, *Royle Ill.* 214, t. 44; *Boiss. Fl. Orient.* i. 763. M. Hoffmeisteri, *Klotz. Reis. Pr. Waldem.* 120, t. 25 (plume sessile). Tamarix germanica, *Linn.*

TEMPERATE and ALPINE HIMALAYA; from SIKKIM to KUMAON, alt. 10–14,000 ft.—DISTRIB. Westward to Europe.

A bush, 4–8 ft. *Stems* slender, striate, glaucous-green when young. *Leaves* linear-lanceolate. *Racemes* 1–18 in., spiked, lateral or terminal. *Bracts* with broadly membranous margins. *Sepals* about equalling the petals.

VAR. *prostrata,* Benth. and Hook. f. Gen. Pl. i. 161 (sp.); prostrate, branchlets ascending, often very short with closely imbricate leaves, seed-plume sessile.—A very Alpine form.

2. **M. elegans,** *Royle Ill.* 214; bracts ovate about twice as long as the pedicels, sepals connate below, stamens connate for one-fourth of their length. M. germanica *var.* longifolia, *Herb. Ind. Or. H. f. & T.*

WESTERN HIMALAYA and WESTERN TIBET, from Garwhal, alt. 11,500 ft., *Royle,* &c., to Ladak, &c., alt. 6–15,000 ft., *T. Thomson.*

A bush, with smooth striate slender stems. *Leaves* oblong-ovate, narrowed at the base. *Racemes* 3 in., lateral, lax. *Bracts* short, acuminate, with narrowly membranous margins. *Sepals* much shorter than the petals, obtusely triangular at the apex.

ORDER XXI. **ELATINEÆ.** (By W. T. Thiselton Dyer, F.L.S.)

Minute semi-aquatic or terrestrial herbs or undershrubs. *Leaves* opposite or whorled, entire or serrate, stipulate. *Flowers* small, axillary, solitary or cymose. *Sepals* and *petals* each 2–5, free, imbricate in bud. *Stamens* as many or twice as many as the sepals, hypogynous, free; anthers versatile. *Ovary* free; cells and styles 2–5, stigmas capitate; ovules many, on the inner angles of the cells, anatropous, raphe lateral or ventral. *Capsule* septicidal; valves flat concave or incurved, separating from the axis and septa. *Seeds* straight or curved, raphe on the concave side, testa often rugose, albumen scanty or 0; embryo cylindric, straight or curved, cotyledons small.—DISTRIB. Scattered over the world; genera 2, known species about 20.

Sepals obtuse, aquatic herbs . . . . 1. ELATINE.
Sepals acute, flowers usually 5-merous . . . . 2. BERGIA.

1. **ELATINE,** Linn.

Minute aquatic tender creeping herbs. *Leaves* opposite or whorled. *Flowers* very small, axillary, usually only one to each node. *Sepals* 2–4, membranous obtuse. *Petals* 2–4. *Ovary* globose. *Capsule* membranous; septa evanescent after bursting or adhering to the axis. *Seed* cylindric, straight or curved, ridged and pitted.—DISTRIB. Temperate and subtropical regions; species about 6.

1. **E. americana,** *Arn. in Edin. Journ. Nat. Sc.* i. 431; flowers sessile or nearly so, stamens longer than the sepals.

Nilghiri Mts., *Schmidt.*—Distrib. N. America (usually dimerous), N. Zealand, Australia.

Prostrate on mud in patches 1–3 in. broad. *Stems* rooting at the nodes, with numerous opposite or alternate ultimately ascending branches. *Leaves* $\frac{1}{8}$–$\frac{1}{3}$ in., opposite, ovate-lanceolate, narrowed to the base, entire, minutely scabrid; stipules scarious, acute, incise-serrate. *Flowers* fully $\frac{1}{12}$ in. diam. *Sepals* 3, 2 slightly herbaceous. *Petals* 3, twice as long as the sepals, with a mid-vein. *Seeds* about 12 in each cell, slightly curved.—*Asa Gray, Gen. Ill.* t. 95, represents entire stipules united at the base and sepals exceeding the pistil; American specimens disagree with the figure in these respects and agree with the Indian plant.

2. **E. ambigua,** *Wight in Hook. Bot. Misc.* ii. 103, t. 5; flowers pedicelled, stamens shorter than the sepals. *W. & A. Prodr.* 41; *Wight Ill.* t. 25 B; *Seubert in Nov. Act. Nat. Cur.* xxi. t. 2, f. 11–14.

Western Peninsula, *Wight.*—Distrib. Fiji Islands.

Habit of *E. americana,* Arn. *Leaves* oblong-lanceolate. *Sepals, petals* and *stamens* each 3.—Probably should be united with the preceding and *E. triandra,* Schk. (which differs in the absence of the superior petal). The aggregate species would have a cosmopolitan range.

2. **BERGIA,** Linn.

Annuals or undershrubs, erect, decumbent, or diffusely branched, often pubescent. *Leaves* opposite, serrate, or sometimes quite entire. *Flowers* solitary or in more or less dense axillary fascicles, minute, usually 5-merous. *Sepals* with a herbaceous midrib and more or less membranous margins, acute. *Ovary* ovoid. *Capsule* subcrustaceous, septicidal or septifragal.—Distrib. Warm countries throughout the world; known species about 14.

1. **B. odorata,** *Edgew. in Journ. Asiat. Soc. Beng.* vii. 765 (1838); pubescent-glandular, flowers fascicled pedicelled 2–8 together. Lancretia suffruticosa, *Delile Fl. Egypt.* 69. B. suffruticosa, *Fenzl in Denks. Bot. Gesell.* iii. 183; *Boiss. Fl. Orient.* i. 783.

Sikh States at Balawati, *Edgeworth;* Sindh at Kurrachee, *Stocks.* — Distrib. Trop. Africa, Egypt.

Woody, diffuse, 1 ft. or less, aromatic, with papery deciduous bark. *Leaves* $\frac{1}{12}$–$\frac{1}{3}$ in., sessile, thick, elliptic or ovate, margins crenate-serrate, often reflexed. *Flowers* $\frac{1}{6}$ in. long, on branches barren below. *Sepals* 5, ovate, herbaceous, serrulate. *Petals* obovate. *Stamens* 10, filaments dilated below. *Ovary* grooved; styles 5, one-half the length of the ovary. *Capsule* 5-celled. *Seeds* numerous, minute, shining, slightly curved.—A very variable plant. Smells of chamomile.

2. **B. æstivosa,** *W. & A. Prodr.* 41; nearly glabrous, flowers solitary or 2–4 together. Elatine æstivosa, *Wight Ic.* t. 222. Spergula æstivosa, *Kœn. ex Wall. Cat.* 6963.

Panjab, *Thomson;* Moultan, *Edgeworth.*

Branches slender, divaricate. *Leaves* narrow-obovate or oblong, faintly serrate. *Flowers* pink, on branches with almost linear leaves barren above. *Sepals* lanceolate, acute, denticulate, with membranous margins.—Probably only a variety of *B. odorata,* but distinct in habit.

3. **B. ammannioides,** *Roxb. Hort. Beng.* 34; *Fl. Ind.* ii. 457; annual, flowers in dense subverticillate fascicles, stamens 3–5. *Roth. Nov. Pl. Sp.* 219; *Wight in Hook. Bot. Misc.* iii. 93, *Suppl.* t. 28; *Ill.* i. t. 25 A.; *Wall. Cat.* 655; *Boiss. Fl. Orient.* i. 472. B. pentandra, *Guill. & Perr. Fl. Seneg.* 42, t. 12. Elatine ammannioides, *W. & A. Prodr.* 41. Sagina ammannioides, *Wall. Cat.* 7504.

Throughout INDIA and CEYLON; in marshy places.—DISTRIB. Affghanistan, Persia, Tropical Asia, Africa, and Australia.

Stems 3–12 in., erect or with the lower branches decumbent, smooth or thinly pubescent-hispid, the stem-hairs often glandular-capitate. *Leaves* ½–¾ in., sessile, linear, lanceolate or oblanceolate, tapering below, sharply serrate, acute. *Flowers* $\frac{1}{12}$ in., sessile or shortly pedicelled. *Sepals* 5, lanceolate, denticulate. *Petals* and *stamens* 5. *Ovary* oblong, deeply grooved. *Capsule* 3–6-celled; valves with incurved edges, dehiscing from a central axis. *Seeds* numerous, ovoid.

VAR. *trimera;* Fisch. & Mey. in Linnæa, x. 74 (sp.); flowers trimerous. B. ammannioides β flor. triandr.; *Wight in Hook. Bot. Misc.* iii. 93, t. 28, f. 1 and 2; Lechea verticillata, *Willd. ex DC. Prod.* i. 286.—Western Peninsula and Ceylon.

4. **B. verticillata**, *Willd.; Roxb. Fl. Ind.* ii. 456; glabrous, stems procumbent rooting, stamens 10. *Thw. Enum.* 23. Elatine (B) verticillata, *W. & A. Prodr.* 41. B. aquatica, *Roxb. Corom. Pl.* ii. 22, t. 142; *Boiss. Fl. Orient.* ii. 783. B. capensis, *Linn.; Rheede Hort. Mal.* ix. t. 78.

WESTERN PENINSULA, CEYLON and RANGOON.—DISTRIB. Widely spread in the tropics but absent from S. Africa.

A glabrous rather succulent annual aquatic herb, ½–1 ft. *Leaves* 1–1½ in., spreading, elliptic-lanceolate, tapering at either end, acute, faintly crenate-serrate; stipules narrowly deltoid, toothed, acute. *Sepals* 5, narrow-lanceolate, obliquely acuminate, midrib herbaceous. *Petals* 5. *Capsule* globose-ovoid. *Seeds* minute, slightly curved, ribbed and transversely rugose.—Not a native of the Cape, Linnæus's original name has therefore been suppressed.

ORDER XXII. **HYPERICINEÆ.** (By W. T. Thiselton Dyer, F.L.S.)

Herbs or shrubs, rarely trees. *Leaves* opposite, often punctate with pellucid glands or dark glandular dots, entire or glandular-toothed; stipules 0. *Flowers* solitary or cymose, terminal, rarely axillary. *Sepals* and *petals* each 5, rarely 4; petals contorted in bud. *Stamens* ∞, or rarely definite, 3- or 5-adelphous, rarely free or all connate; anthers versatile. *Ovary* 3–5-carpellary, 1- or 3–5-celled; styles as many, filiform, free or united; ovules few or ∞, on parietal or axile placentas, anatropous, raphe lateral or superior. *Fruit* capsular or baccate. *Seeds* exalbuminous; embryo straight or curved.—DISTRIB. Temp., and mountains of warm regions; genera 8, species about 210.

TRIBE 1. **Hypericeæ.** *Capsule* dehiscing septicidally or at the placentas. *Seeds* not winged.

Flowers 4-merous . . . . 1. ASCYRUM.
Flowers 5-merous . . . . 2. HYPERICUM.

TRIBE 2. **Cratoxyleæ.** *Capsule* dehiscing loculicidally. *Seeds* winged.
3. CRATOXYLON.

1. **ASCYRUM,** Linn.

Herbs or shrubs. *Leaves* small, entire. *Flowers* terminal, nearly solitary, yellow, 4-merous. *Sepals* leafy, the 2 outer largest. *Stamens* slightly connate or free. *Ovary* 1-celled. *Capsule* 2–4-valved, dehiscing at the placentas.—DISTRIB. Except the endemic Indian species confined to N. Amer. and the Antilles; species 6.

1. **A. filicaule,** *Dyer.*—Hypericum filicaule, *H. f. & T. ms.*

TEMPERATE SIKKIM HIMALAYA; Lachoong valley, alt. 12,000 ft., *J. D. H.*

A perennial herb. *Stems* 3–6 in., slender, cylindric, faintly 2-edged, rooting at the base. *Leaves* ⅓ in. or less, subsessile, broadly elliptic, obtuse, pellucid-punctate, margins wavy. *Flowers* ½ in. diam., solitary. *Sepals* oblong, obtuse, outermost exceeding the petals. *Styles* 3, $\frac{1}{12}$ in., rather shorter than the ovary.

2. **HYPERICUM,** Linn.

Herbs, shrubs, or small trees. *Leaves* usually sessile. *Flowers* cymose, yellow, terminal, or axillary. *Sepals* 5. *Petals* 5, usually oblique. *Ovary* 1-celled with 3 or 5 parietal, or 3–5-celled with axile placentas; styles free or united; ovules ∞, rarely few. *Capsule* septicidal, or dehiscing at the placentas.—DISTRIB. Temperate regions; species 160.

H. calycinum, L., from S. Europe, occurs as a garden plant.

H. chinense, L.; H. monogynum, *Willd.; Roxb. Fl. Ind.* iii. 400, is said to be known only as a cultivated plant. It is found in Indian gardens; the leaves are elliptical and obtuse, and the styles united throughout. Hypericum salicifolium, *Sieb. & Zucc.*, of Japan is probably not distinct from this.

SECT. I. **Androsæmineæ,** *Spach. Sepals* 5, unequal. *Petals* deciduous. *Stamens* 5-adelphous at the base. *Ovary* 5-celled.—(Commonly shrubs with few and large flowers.)

* *Styles longer than the ovary* (*unknown in* 1).

1. **H. Griffithii,** *H. f. & T. ms.;* leaves ovate subcordate, cymes corymbose, sepals small narrowly deltoid, styles 5.

BHOTAN, Dimree-nuddee, alt. 6400 ft., *Griffith.*

A shrub, young branches terete. *Leaves* 2–4½ in., obtuse, younger lanceolate acute, firm, glaucescent below with prominent reticulate nerves. *Sepals* ⅛ in. long, acute. *Capsule* ⅓–½ in. long.—Flowers unknown; habit that of *H. grandifolium*, Choisy.

2. **H. mysorense,** *Heyne in Wall. Cat.* 4808; leaves oblong-lanceolate decussate approximate, sepals ovate, styles exceeding the stamens. H. myrtifolia, *Spach Suit. Buff.* v. 428? Norisca mysorensis, *Wight Ic.* t. 56.

WESTERN PENINSULA; on the hills from the Concan to the Pulneys, alt. 3–4000 ft. CEYLON, *Walker*, &c.

A glabrous shrub 4–6 ft. high (Gardner); young branches 4-angled. *Leaves* 1–2 in., tapering to an amplexicaul base, with slender ascending veins and pellucid striæ. *Cymes* terminal, 3-flowered; flowers 2–2¾ in. diam. *Sepals* ½ in., acute. *Petals* obliquely oblanceolate, twice the length of the stamens. *Styles* twice as long as the ovary. *Capsule* about ½ in.—The allied Abyssinian *H. gnidiæfolium*, Rich., has styles ¾ united.

3. **H. cernuum,** *Roxb. Hort. Beng.* 59; *Roxb. Fl. Ind.* iii. 400; leaves elliptic to ovate-lanceolate, glaucous beneath, sepals ovate, styles slightly exceeding the stamens. *Camb. in Jacq. Voy. Bot.* t. 23. H. oblongifolium, *Choisy Prodr. Hyp.* 42, t. 4. H. speciosum, *Wall. Cat.* 4803. H. Govanianum, *Wall. Cat.* 4815 (sepals linear-lanceolate).

WESTERN TEMPERATE HIMALAYA; from Kumaon to Sirmur, alt. 5–7000 ft.

A glabrous shrub, 3–6 ft.; branches cylindric, glaucous when young. *Leaves* 1–3 in., sessile, minutely dotted. *Cymes* terminal, 3–5-flowered; flowers 2 in. diam., white, then yellowish. *Sepals* ¼ in., acute. *Petals* obovate, longer than the stamens. *Styles* twice the length of the ovary. *Capsule* ½ in., conical.

4. **H. cordifolium,** *Choisy in DC. Prodr.* i. 545; leaves oblong-lanceolate cordate coriaceous glaucous beneath, sepals lanceolate. H. bracteatum, *Wall. Cat.* 4804; *Pl. Asiat. Rar.* t. 220. H. acutum, *Wall. Cat.* 4807.

Central Himalaya; Nipal, *Wallich;* Kumaon, at Ramari, alt. 4500 ft., *Strach. & Wint.*

A glabrous shrub, 1–2 ft.; branches long, slender, brown; branchlets subtetragonous. *Leaves* 1–2 in., coriaceous, opaque with translucent lines, penninerved with one or two lateral veins and midrib darkly marked below. *Cymes* many-flowered; flowers 1½ in. diam. *Sepals* ¼–½ in. *Petals* obliquely obovate. *Stamens* equalling the styles, ⅔ the length of the petals. *Styles* 1½ times as long as the ovary.

5. **H. lysimachioides,** *Wall. Cat.* 4817; leaves ovate subsessile glaucous beneath with dark veins, sepals linear-lanceolate. H. coriaceum, *Royle Ill.* 131.

Western Temperate Himalaya; from Kumaon, alt. 8–9000 ft., to Wardwan, alt. 5–6500 ft., *Stewart.*

A glabrous shrub, branchlets subtetragonous. *Leaves* ¾–1¾ in., acute or rather obtuse, penninerved, the veins connected marginally, pale and black-dotted beneath. *Cymes* loose, leafy, 2–3-chotomous; flowers 1 in. diam. *Sepals* ⅓ in. *Petals* lanceolate. *Styles* slightly longer than the ovary, not exceeding the stamens. *Capsule* about ¼ in.

** *Styles not longer than the ovary.*

6. **H. Hookerianum,** *W. & A. Prodr.* 99; branches terete, leaves ovate to ovate-oblong, sepals obovate, styles recurved exceeding the stamens. *Wight Ic.* 949. H. oblongifolium, *Hook. Bot. Mag.* t. 4949.

Sikkim Himalaya, alt. 8–12,000 ft., *J. D. H.*; Mishmi, *Griffith;* Khasia Mts., alt. 4–6000 ft., *Lobb.*, &c.; Nilghiris, *Wight*, &c.

A glabrous shrub 6–8 ft.; branches red-brown. *Leaves* 1–4 in., sessile or very shortly stalked, obtuse, mucronate, firm, glaucous or rusty beneath, faintly pellucid-punctate. *Cymes* few-flowered or corymbose, leafy-bracteate; flowers about 2 in. diam., golden-yellow. *Sepals* ⅓–½ in. *Petals* obliquely-obovate, longer than the stamens. *Styles* ⅙ in., shorter than the ovary. *Capsule* ¾ in., obtusely conical to egg-shaped.

Var. *Leschenaultii*, Choisy in DC. Prodr. i. 145 (sp.); Deless. Ic. Sel. iii. t. xxvii.; sepals acute. H. triflorum, *Blume, Fl. Ned. Ind.* 142. H. oblongifolium, *Wall. Cat.* 4810 (*not of Choisy*). H. Choisianum, *Wall. Cat.* 4805.—Nipal, *Wallich;* Sikkim, alt. 8000 ft., *J. D. H.*—Distrib. Java.

7. **H. patulum,** *Thunb. Fl. Jap.* 295, t. 17; branches spreading pyramidally 2-edged, leaves elliptic-lanceolate, sepals elliptic obtuse, styles exceeding the stamens. *Wall. Cat.* 4809; *Hook. Bot. Mag.* 5693; *Don Prodr.* 218. H. Uralum, *Ham. ex Don l.c.; Bot. Mag.* t. 2375; *DC. Prodr.* 218. H. oblongifolium, *Wall. Pl. Asiat. Rar.* t. 244 (*not of Choisy in Wall. Cat.*).

Throughout the Temp. Himalaya (Sikkim excepted); alt. 3–7000 ft., from Bhotan, *Griffith*, to Simla, *Lady Dalhousie*, and Chamba, *Stewart.* Khasia Mts., alt. 5–6000 ft.; Yunan, *J. Anderson.*—Distrib. Japan, Formosa.

A glabrous shrub, 1–3 ft., with brownish bark and numerous red, stiffly patent branches. *Leaves* 1–2½ in., distichous, very shortly petioled, acute, black-dotted and glaucescent or rusty beneath, pellucid punctate and striate, margins reflexed. *Cymes* few-flowered, terminal; peduncles 2-bracteate; flowers 1 in. diam. *Sepals* ¼ in. *Petals* orbicular, twice the length of the stamens. *Styles* equalling the ovary. *Capsule* ½ in., obtusely conical.—Nearly allied to *H. Hookerianum* but smaller, more rigid, and with smaller flowers.

Var. *attenuatum*, Choisy in DC. Prodr. i. 545; more slender in every part.

8. **H. tenuicaule,** *H. f. & T. ms.;* branches diffuse slender terete, leaves elliptic or ovate pellucid striate, flowers solitary or geminate, sepals elliptic, styles not exceeding the stamens.

Temperate Sikkim Himalaya; Lachen valley, alt. 8000 ft., *J. D. H.*

A glabrous shrub. *Leaves* 1–1½ in., tapering below, subacute, pale and glandular-dotted beneath. *Flowers* 1½ in. diam., usually exceeded by lateral leafy shoots. *Sepals* about ⅙ in., obtuse. *Petals* obliquely obovate, twice the length of the stamens. *Styles* scarcely ⅙ in., about as long as the ovary. *Capsule* ⅓ in.—Perhaps a variety of *H. patulum*, but distinct in habit.

9. **H. reptans,** *H. f. & T. ms.;* stems shrubby prostrate diffuse rooting, flowers terminal solitary.

Temperate Sikkim Himalaya, alt. 9–11,000 ft., *J. D. H.*
Branches slender, two-edged, reddish-brown. *Leaves* ¼–½ in., approximate, elliptic-oblong, obtuse, with short pellucid striæ. *Flowers* 1¾ in. diam. *Sepals* about ½ in., elliptic, obtuse. *Petals* obovate. *Stamens* hardly exceeding the ovary. *Styles* ⅙ in., equalling the ovary, tips recurved. *Capsule* ½ in., globose. *Seeds* minute, apiculate at both ends.

Sect. II. **Hyperineæ,** *Spach.* *Sepals* 5, connate at the base, equal or unequal. *Petals* persistent. *Stamens* 3-adelphous at the base. *Ovary* 3-celled.

* *Margins of the sepals eglandular.*

10. **H. perforatum,** *Linn.;* stem erect 2-edged, leaves oblong or ovate pellucid-punctate. sepals linear acute.

Temperate Western Himalaya; from Kumaon, alt. 6–9000 ft., to Kashmir, alt. 3–6500 ft.—Distrib. Europe, N. Africa, N.W. Asia.
A perennial herb. *Stems* 18 in., with slender stolons, branched above. *Leaves* ¾ in., obtuse, with radiating veins, paler beneath with black dots. *Cymes* corymbose, 3-chotomously branched; flowers 1 in. *Sepals* ⅙ in. *Petals* with black-glandular edges. *Styles* twice the length of the ovary, equalling the stamens. *Capsule* ⅓ in., egg-shaped.
Var. *debile*, Royle, ms.; stem weak, leaves oblong-linear.

11. **H. Sampsoni,** *Hance in Seem. Journ. of Bot.* iii. 378; stems erect cylindric, leaves oblong connate pellucid-punctate, sepals oblong obtuse.

Khasia Mountains, Nowgong, *Simons.*—Distrib. S. China, Formosa.
A perennial herb. *Stems* 1 ft. *Leaves* 1½–2 in., obtuse, glaucescent beneath. *Cymes* lax; flowers ¼–⅓ in. diam. *Sepals* black-punctate. *Petals* about equalling the sepals. *Styles* very short. *Capsule* ovoid, covered with oval resinous vesicles.—Approaches *H. erectum*, Thb., of Japan, which is destitute of vesicles and has the leaves amplexicaul.

12. **H. petiolulatum,** *H. f. & T. ms.;* stems erect slender cylindric, leaves shortly petioled ovate elliptic, flowers small, sepals linear unequal, styles very short exceeded by the stamens.

Sikkim Himalaya, alt. 9000 ft., *J. D. H.*
Stems 9–15 in., branched from the base; branches weak, simple. *Leaves* ½–¾ in., rather distant, obtuse, glaucescent beneath with dark pellucid dots, margins wavy. *Cymes* 3-flowered; flowers ⅙ in. long. *Sepals* $\frac{1}{12}$–⅙ in., acute, not pellucid-punctate. *Capsule* with numerous glandular lines.

13. **H. humifusum,** *Linn.;* stems procumbent 2-edged, leaves sessile elliptic to ovate approximate, sepals lanceolate unequal, styles ½ the length of the ovary. H. rubrum, *Wight ms.*

Nilghiris, *Wight.*—Distrib. Europe, Atlantic Isles, S. Africa.
A glabrous perennial herb. *Stems* about 6 in., numerous, red. *Leaves* ¼–½ in., pellucid-punctate and as well as the sepals with black intramarginal glands. *Cymes* terminal, few-flowered. *Flowers* ⅓–½ in. diam.

** *Margins of the sepals with gland-tipped teeth.*

14. **H. elodeoides,** *Choisy in DC. Prodr.* i. 552; stems stout usually

simple, leaves oblong or ovate acute firm, sepals with long teeth, petals glandular-striate. H. adenophorum, *Wall. Cat.* 4812. H. nervosum, *Don Prodr.* 219.

TEMPERATE HIMALAYA; from Sikkim, alt. 7–12,000 ft., to Sirmur, alt. 7–8000 ft.; KHASIA MTS., alt. 4–6000 ft.; ASSAM and BIRMA, *Griffith.*

Stems 1–2 ft., stoloniferous, glabrous, terete. *Leaves* 1–1$\frac{1}{2}$ in., approximate, stem-clasping, uppermost glandular-fringed at the base, closely pellucid-punctate. *Cymes* paniculate; flowers $\frac{3}{4}$ in. *Sepals* $\frac{1}{4}$ in., lanceolate, acute, with black intramarginal glands. *Petals* exceeding the calyx. *Styles* 3, $\frac{1}{4}$ in., at least twice the length of the ovary, spreading, not exceeding the stamens. *Capsule* $\frac{1}{3}$ in.—A very variable plant, allied to the European *H. montanum*, L., which is puberulous with a denser cyme and shorter sepaline teeth. *H. intermedium*, Steud., of Abyssinia and Asia Minor, has shorter teeth but a very open cyme.

15. **H. napaulense,** *Choisy in DC. Prodr.* i. 552; stems weak with numerous branches, leaves ovate to ovate-lanceolate obtuse thin, sepals with short teeth, petals eglandular or nearly so. H. pallens, *Don Prodr.* 219. H. setosum, *Wall. Cat.* 4814. H. Wightianum, *Wall. Cat.* 4010; *W. & A. Prodr.* 99; *Wight. Ill.* i. 43.

TEMPERATE HIMALAYA; from Sikkim, alt. 10–12,000 ft. to Kashmir, alt. 7–8000 ft.; BIRMA, *Griffith.*—WESTERN PENINSULA, Nilghiri and Pulney Mts., *Wight*, &c.

Stems slender, diffuse or prostrate, cylindric, obscurely 2-edged. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ in., sessile and stem-clasping, or slightly petioled, glaucous beneath and closely pellucid-punctate. *Cymes* few-flowered, loose; flowers $\frac{1}{3}$ in. *Sepals* lanceolate. *Petals* longer than the calyx. *Styles* $\frac{1}{8}$ in., about equalling the ovary, exceeding the stamens. *Capsule* $\frac{1}{6}$ in.—Perhaps only a variety of *H. elodeoides.*

16. **H. monanthemum,** *H. f. & T. ms.*; stems simple, leaves broadly elliptic or ovate, sepals dark-glandular-striate, petals linear twice the length of the sepals, styles half the length of the ovary.

SIKKIM HIMALAYA; Lachen and Lachoong Valleys, alt. 11–12,000 ft., *J. D. H.*

Stems 4 in.–1 ft., erect, 2-edged, reddish brown. *Leaves* $\frac{3}{4}$ in., sessile, obtuse, pellucid striate-punctate, with a few black marginal dots beneath. *Cymes* 1–3-flowered; flowers with a pair of glandular fringed bracts. *Sepals* linear-lanceolate. *Syles* $\frac{1}{12}$ in., equalling the stamens. *Capsule* $\frac{1}{4}$ in., ovoid.

SECT. III. **Brathydineæ,** *Spach. Sepals* 5, *Petals* persistent. *Stamens* connate at the base. *Ovary* 1-celled.

17. **H. japonicum,** *Thunb. Fl. Jap.* 295, t. 31; stems diffuse or ascending, leaves 3-nerved, cyme dichotomous elongated, sepals 3-nerved. *Wall. Cat.* 4811. *Royle Ill.* t. 24. H. pusillum, *Choisy in DC. Prodr.* i. 549. Brathys nepalensis, *Blume Mus. Bot.* ii. 19. H. calycatum, *Jacq. Herb.* (sepals foliaceous).

TEMPERATE and SUBTROPICAL HIMALAYA, from Sikkim to Garwhal; alt. 2–5000 ft. KHASIA MTS.; ASSAM, SILHET, BIRMA; EASTERN and WESTERN PENINSULA and CEYLON.—DISTRIB. New Zealand, Australia, Japan, China, Java.

Annual. *Stems* 1–15 in., tufted or prostrate, glabrous, 4-angled. *Leaves* $\frac{1}{2}$ in. or less, stem-clasping, oval or ovate, pellucid-punctate. *Flowers* $\frac{1}{4}$ in. diam., yellow. *Bracts* and *sepals* linear-lanceolate, entire, acute, glandular and pellucid-punctate at the apex. *Petals* equalling the calyx. *Styles* $\frac{1}{3}$ the length of the ovary. *Capsule* $\frac{1}{6}$ in. *Seeds* ribbed and transversely striate.—*H. humifusum* is distinguished by its 2-edged stems, 3-celled ovary, and leaves with intra-marginal black dots.

18. **H. Lalandii,** *Choisy in DC. Prodr.* i. 550; stems slender simple, leaves approximate below appressed with revolute margins 1-nerved, cyme

close often few-flowered, sepals with one prominent nerve. H. fœtidum, *H. f. & T. ms.*

Khasia Mts., alt. 5–6000 ft., *Lobb*, &c.—Distrib. S. Africa, Lower Guinea.

Annual. Smell remarkably fœtid, like bad orange-peel. *Stems* 6–18 in., slender. simple, tufted. *Leaves* ½ in., or less, rather thick, faintly pellucid-punctate. *Sepals* elliptic-oblong. *Styles* ½ the length of the ovary.—Probably a variety of *H. japonicum*, but identical with the African plant.

Sect. IV. **Elodeineæ,** *Spach.* *Stamens* definite (9), cohering for ⅓ their length into 3 bundles separated by (entire) hypogynous scales.

19. **H. breviflorum,** *Wall. Cat.* 4876; stems usually simple cylindric lower ⅔ bare, flowers in 1–3 short axillary cymes.

Khasia Mts., alt. 5000 ft.; Silhet, *Wallich.*

Stems 1½ ft. *Leaves* narrow elliptic, black-dotted beneath. *Flowers* white. *Sepals* very short, ovate-linear, obtuse. *Anthers* vesicular-apiculate. *Styles* ⅔ the length of the ovary, recurved. *Capsule* ¼ in., ovoid.—The allied *H. petiolatum*, Walt., of N. America and Japan has cylindric capsules.

3. **CRATOXYLON,** Blume.

Shrubs or trees. *Leaves* entire, usually papery. *Inflorescence* axillary or, terminal, cymose. *Sepals* and *petals* each 5. *Stamens* 3- or 5-adelphous, with fleshy hypogynous glands alternating with the bundles. *Ovary* 3-celled; styles distinct; ovules 4–∞ in each cell. *Capsule* 3-valved.—Distrib. Tropical Asia; species about 12.

Sect. I. **Ancistrolobus,** *Spach.* *Petals* subpersistent, inappendiculate. *Stamens* 3-adelphous, hypogynous; glands more or less cucullate.

1. **C. polyanthum,** *Korth. Verhand. Nat. Gesch. Bot.* 175, t. 36; leaves elliptic to oblong, cymes 1–3-flowered axillary or slightly supra-axillary, petals glandular-veined.

Birma and the Eastern Peninsula.—Distrib. China (*C. biflorum*), Philippines, Borneo.

A glabrous aromatic shrub, with compressed branchlets. *Leaves* 1–4 in., pellucid-punctate and black-dotted beneath. *Flowers* ½ in. diam., pink. *Sepals* ⅙ in. long, ⅓ in. when in fruit, elliptic, obtuse. *Hypogynous glands* sometimes obsolete. *Capsule* ⅓–½ in. long, exceeding the sepals. *Seeds* 3, ¼ in. long, with an oblique unilateral wing.

Var. 1. *ligustrinum,* Blume Mus. Bot. ii. 16 (sp.); leaves narrowed at both ends acute. C. lanceolatum, *Miq. Fl. Ned. Ind. Supp.* i. 500. Ancistrolobus ligustrinus, *Spach, Suit. Buff.* v. 361. A. brevipes, *Turcz. Bull. Mosc.* 1858, i. 383. Hypericum pulchellum, *Wall. Cat.* 4821. Pegu, Malacca, S. Andamans, *Kurz.*

Var. 2. *Wightii,* Bl. l.c. 18 (sp.). Leaves broadly oval mostly obtuse. Ancistrolobus, sp. *Wight Ill.* i. 111. Hypericum horridum, *Wall. Cat.* 4822. Elodea, sp., *Griff. Notul.* iv. 569. Tenasserim, Mergui, *Griffith;* Tavoy, *Wallich.*

2. **C. neriifolium,** *Kurz in Journ. Asiat. Soc. Beng.* 1872, pt. ii. 293; leaves narrow-oblong sessile, cymes 3-flowered in a short terminal panicle; Hypericum neriifolium, *Wall. Cat.* 4824.

Birmah, Teiyet, *Griffith;* Pegu, Prome hills, *Wallich;* Chittagong, *H. f. & T.*

A shrub, 10 ft. *Leaves* 3–6 in., by ¾–1½ in., slightly cordate, tapering to the apex. *Panicle* 3 in. *Hypogynous glands* with the reflexed margin mucronate. *Capsule* ¼ in., hardly exceeding the calyx.—Agrees otherwise with *C. polyanthum* and closely allied

3. **C. arborescens,** *Blume Mus. Bot.* ii. 17; leaves oblong-obovate or elliptic, cymes forming a pyramidal panicle, petals glandular-dotted. Hypericum arborescens, *Vahl Symb.* ii. 86, t. 43. H. coccineum, *Wall. Cat.* 4823. Ancistrolobus glaucescens, *Turcz. Bull. Mosc.* 1858, i. 383. Vismia? arborescens, *Choisy Prod. Hyp.* 36.

Moulmein, *Lobb; Malacca, Griffith, Maingay;* Sincapore, *Anderson.*—Distrib. Java, Borneo.

A bush? *Leaves* 3–4½ in. by 1½–2 in., coriaceous. *Panicle* 4–9 in. long. *Flowers* ¼ in. diam., scarlet. *Capsule* ⅓ in. long; *seeds* ⅙ in. long, with an equilateral wing.

Sect. II. **Tridesmis,** *Spach. Petals* not persistent, with a basal squamule. *Stamens* 3- or 5-adelphous.

4. **C. formosum,** *Benth. & Hook. f. Gen. Pl.* i. 166; branchlets alternate spreading, hypogynous glands triangular attenuate, fruit pedicels drooping. Tridesmis formosa, *Korth. Verh. Nat. Gesch. Bot.* 179, t. 37. T. ochnoides, *Spach, Suit. Buff.* v. 359. Elodea formosa, *Jack in Hook. Journ. Bot.* i. 374.

Malacca, Mt. Ophir, *Griffith;* Sincapore, *Maingay;* S. Andaman, *Kurz.*—Distrib. Borneo, Philippines.

A very large tree with habit of a *Cerasus*. *Leaves* 2–3½ in., decussate, elliptic or oblong-elliptic, papery, glabrous. *Cymes* in the axils of fallen leaves, shortly racemose; flowers white. *Sepals* not accresent, ¼ the length of the petals. *Basal squamule* of the petals usually rounded. *Stamens* 3-adelphous. *Styles* dimorphic. *Capsule* ¾ by ⅙ in., triquetrous. *Seeds* ⅓ in. long, with a very obtuse, obovate, unilateral wing.

5. **C. Maingayi,** *Dyer;* branchlets spreading opposite, hypogynous glands triangular, fruit pedicels ascending.

Penang, *Maingay.*

A tree above 30 ft., with a very thick stem. *Leaves* 2–3½ by 1–1½ in., elliptic, tapering at both ends, acuminate, midrib reddish-brown beneath, papery, glabrous. *Cymes* in the axils of the often persistent old leaves. *Petals* with black-dotted veins; basal squamule acute. *Stamens* 3-adelphous. *Styles* filiform, as long as petals (but probably dimorphic). *Capsule* ½ in. long, $\frac{1}{12}$ in. broad, slender, cylindric. *Seeds* ¼ in. long, with an oblong unilateral wing.

6. **C. prunifolium,** *Dyer;* branchlets opposite ascending, leaves pubescent, hypogynous glands very short obtuse transversely grooved. Hypericum prunifolium, *Wall. Cat.* 7276. Tridesmis pruniflora, *Kurz in Journ. Asiat. Soc. Beng.* 1872, pt. ii. 293.

Moulmein, *Wallich.*

Stems woody, compressed, rather rigid. *Flowers* precocious, in small, lax, axillary fascicles: pedicels and calyx closely pubescent. *Sepals* ½ the length of the petals. *Basal squamule* of the petals acute. *Stamens* 3-adelphous. *Fruit* not seen.

Order XXIII. **GUTTIFERÆ.** (By T. Anderson, F.L.S.)

Trees or shrubs, abounding in a yellow or greenish juice. *Leaves* opposite, coriaceous or membranous, rarely whorled or stipulate. *Flowers* axillary or terminal, solitary fascicled subracemose or panicled, white yellow or red. *Flowers* regular, diœcious, polygamous or hermaphrodite. *Sepals* 2–6, imbricate or in decussate pairs. *Petals* 2–6 (rarely more, or 0), usually much imbricated or contorted. Male fl.: *Stamens* usually indefinite, hypogynous; filaments free or variously connate, monadelphous or in as many bundles as there are petals; anthers various. Female fl.: *Staminodes* various. *Ovary* 1–2-∞-celled; style slender, short or 0 (2 in *Pœciloneuron*), stigmas as many as the cells free or connate, sometimes peltate; ovules 1–2 or ∞, axile or erect from the base of the cell. *Fruit* usually baccate and indehiscent. *Seeds* large, albumen 0; embryo consisting of a large radicle (*tigellus*) with small or obsolete cotyledons, or of thick free or consolidated cotyledons with a very short inferior radicle.—A large tropical family, common in Asia and America, rare in Africa, of 24 genera and 250 species.

MAMMEA AMERICANA, Linn., the Mammee apple of the West Indies is occasionally cultivated in Indian gardens; it belongs to the tribe *Calophylleæ*, and is distinguished by its valvately 2-partite calyx which is quite entire in the bud.

The following account of the British Indian *Guttiferæ* was drawn up by Dr. Thos. Anderson, late Superintendent of the Calcutta Botanic Garden, shortly before his death in 1870. For the reduction of *Xanthochymus* to *Garcinia* I am answerable, as also for several new species from Maingay's Malacca collections and other sources, and for the reference to Beddome's and Lanessan's works — all such additions are either enclosed between [ ] or signed with my initials.—*J. D. Hooker*.

TRIBE I. **Garcinieæ.** *Ovary*-cells 1-ovuled; stigma sessile or subsessile, peltate, entire or with radiating lobes. *Berry* indehiscent. *Embryo* of a solid tigellus with minute cotyledons or 0.

Calyx of 4 or 5 sepals . . . . 1. GARCINIA.
Calyx closed in bud, bursting into 2 valves . . . . 2. OCHROCARPUS.

TRIBE II. **Calophylleæ.** *Ovary* with 1, 2 or 4 erect ovules; style slender (rarely styles 2), stigma peltate or 4-fid or acute. *Fruit* fleshy, rarely dehiscent. *Embryo* of two fleshy free or consolidated cotyledons, with a small radicle.

Ovary 1-celled, 1-ovuled; style 1, stigma peltate . . . . . . 3. CALOPHYLLUM.
Ovary 1-celled, 4-ovuled; style 1, stigma 4-fid . . . . 4. KAYEA.
Ovary 2-celled, 4-ovuled; style 1, stigma peltate . . . . . . 5. MESUA.
Ovary 2-celled, 4-ovuled; styles 2, stigmas acute . . . . . . 6. PŒCILONEURON.

1. **GARCINIA,** Linn.

(Including XANTHOCHYMUS, *Roxb.*)

Trees, usually with yellow juice. *Leaves* evergreen, coriaceous, very rarely stipulate. *Flowers* solitary fascicled or panicled, axillary or terminal, polygamous. *Sepals* 4–5, decussate. *Petals* 4–5, imbricate. MALE fl.: *Stamens* ∞, free or collected into a ring or an entire globose or conical 4–5-lobed mass, usually surrounding a rudimentary ovary; anthers sessile or on short thick filaments, 2- rarely 4-celled, adnate or peltate, dehiscing by slits or pores or circumsciss. FEMALE or HERMAPHRODITE fl.: *Staminodes* 8–∞, free or connate. *Ovary* 2–12-celled; stigma sessile or subsessile, peltate, entire or lobed, smooth or tubercled; ovules solitary in each cell, attached to the inner angle of the cell. *Berry* with a coriaceous rind. *Seeds* with a pulpy aril.—DISTRIB. Tropical Asia, Africa, and Polynesia; species about 50.

[Kurz (Journ. As. Soc. Bengal. xxxvii. 64) rightly states that *Xanthochymus* cannot be kept distinct from *Garcinia*, for that both 4- and 5-merous flowers occur in *X. pictorius*.—*J. D. H.*]

SUBGENUS I. **Garcinia** proper. *Sepals* and *Petals* 4 each.

Series A. Stigma divided into rays, or deeply 4-lobed (unknown in *G. bancana*).

* Stamens of male flowers in 4 masses or in a 4-lobed mass surrounding the rudimentary ovary; anthers oblong, dehiscing vertically.

1. **G. Mangostana,** *Linn.*; leaves elliptic-oblong acuminate, nerves very numerous horizontal, petiole short thick, male fl. 1½ in. diam. yellow-red or purple, stamens in 4 masses, stigma sessile. *DC. Prodr.* i. 560; *Roxb. Fl. Ind.* ii. 618; *Hook. Bot. Mag.* t. 4847; *Chois. Guttif. Ind.* 33; *Planch. & Trian. Mem. Guttiff.* 170; [*Lanessan Mem. Garcin.* 15].

Native and cultivated in the Malayan Peninsula and Southern Tenasserim.—Distrib. Malay Archipelago, cult. in Ceylon and a few spots in the Madras Presidency.

A small conical tree 20–30 ft.; branches many, decussate. *Leaves* 6–10 by 2½–4¼ in., very coriaceous; nerves regular, close, inarching with an intramarginal one. Male fl. in 3–9-flowered terminal fascicles; pedicels short. *Sepals* orbicular, concave, persistent. *Petals* broad-ovate, fleshy. *Stamens* indefinite. Hermaph. fl. 2 in. diam., solitary or geminate at the tips of the young branches; pedicels ½ in., thick, woody. *Sepals* and *petals* as in the male. *Stamens* many, filaments slender, connate below. *Ovary* 4–8-celled. *Stigma* sessile, 8-rayed; ovules solitary. *Berry* as large as an orange, smooth, dark purple; pericarp firm, spongy. *Seeds* large, flattened; aril very fleshy, white, juicy.

2. **G. cornea,** *Linn.*; leaves oblong or oblong-lanceolate, petiole ½ in., male fl. ¾ in. diam. pale-green, stamens in a 4-lobed mass, style short. *DC. Prodr.* i. 561; *Roxb. Fl. Ind.* ii. 629; *Wight Ic.* t. 105; *Wall. Cat.* 4852 in part; *Chois. Guttif. Ind.* 33; *Planch. & Trian. Mem. Guttif.* 170; [*Lanessan Mem. Garcin.* 20]. G. affinis, *Wall. Cat.* 4852, –3, and –4 in part, not of *W. & A.* Discostigma fabrile, *Miquel Fl. Ned. Ind. Suppl.* 496 (*Kurz in Journ. As. Soc. Bengal*, xxxix. p. 64).

Eastern Bengal from Silhet to Tenasserim, Penang, and Malacca. — Distrib. Malay Archipelago.

A small tree; trunk erect, branches horizontal and pendulous. *Leaves* 4–6 by 2–3 in., leathery, shining, often acuminate; veins stout, prominent, ⅛–⅙ in. apart, straight or forked, inarching with an intramarginal one. Male fl. inodorous, in 3–9-flowered terminal fascicles, pedicels 1–1½ in. *Sepals* orbicular, coriaceous. *Petals* ovate, concave, twice as long as the sepals and thinner. *Staminal masses* united at their base only. Hermaph. fl. usually solitary, like the males; pedicel short, stout, terminal. *Stigma* large, 4–6-lobed, glutinous. *Berry* subspherical, the size of a small orange, bright-red; pericarp spongy. *Seeds* enclosed in a white juicy very acid aril.—All Cumming's specimens marked 2296 are from Malacca; his 1124 are from the Philippines and referable to Blancos Cambogia venulosa (*Garcinia*, Choisy), differing in the large flowers, thick woody pedicels and many-lobed stigma. Wallich's specimen *G. affinis*, 4854) is the only Silhet one I have seen; other of his specimens ticketed (*G. affinis* belong to *G. anomala.* [M. Lanessan, *Mem. Garc.* 21, refers this to *G. celebica*, Linn. There are two or more species or forms comprised under this description of *G. cornea*, one with narrow leaves and very oblique veins, the other with broad leaves and much closer-set veins more spreading from the midrib. This last resembles in foliage the *G. malaccense*, and is apparently common in the Eastern Peninsula.—*J. D. H.*]

3. **G. speciosa,** *Wall. Pl. As. Rar.* iii. t. 258; *Cat.* 4852 E; leaves oblong or elliptic-oblong narrowed at both ends, petiole ¾ in. thick angled, male fl. 1½ in. diam. bright yellow. *Chois. Guttif. Ind.* 33; *Planch. & Trian. Mem. Guttif.* 171.

Tenasserim, near Amherst; Moulmein; Martaban; Andaman Island, *Kurz.*

A tree about 50 ft., trunk straight, erect, 2 ft. diam.; bark thin, greyish-black. Leaves 5–12 by 1¾–3 in., leathery. Male fl. as in *G. cornea* but larger, and very fragrant. Female fl. unknown.—Closely allied to *G. cornea.* [M. Lanessan, Mem. Garcin. 15, refers this species as a synonym to *G. Mangostana.*]

** Stamens of male flower in a central shortly-stalked 4-angled or columnar mass; anthers quadrate, dehiscing vertically; rudimentary ovary usually 0.

† *Male flower in* 3–∞-*fld. terminal and axillary fascicles; fruit subglobose or ovoid, tip mamillar* (*unknown in* G. bancana).

4. **G. indica,** *Chois. in DC. Prodr.* i. 561 (according to *Lanessan Mem. Garcin.* 45); leaves obovate- or oblong-lanceolate acute or acuminate, male pedicels 1–1½ in., fruit globose as large as an orange purple not furrowed. *Planch. & Trian. Mem. Guttif.* 183; *Lanessan Mem. Garcin.* 45. G. purpurea, *Roxb. Fl. Ind.* ii. 624; *Graham Cat. Bomb. Pl.* 25; *Wight Ill.* i. 125; *Dalz. & Gibs. Bomb. Fl.* 31; *Beddome Flor. Sylvat. Gen.* xxi.; *Planch. & Trian. Mem. Guttif.* 191. G. celebica, *Desrouss. in Lamk. Encycl.* iii. 700; and *Chois. Guttif. Ind.* 33 (not of *Rumph.*). Brindonia indica, *Dupetit-Th. in Dict. Sc. Nat.* v. 340.

Western Peninsula; Ghats of Concan and Canara.—Distrib. Cultivated in Bombay, Mauritius, &c. (*I have seen no specimen.*)

A slender tree, with drooping branches. *Leaves* 2½–3½ in., dark-green, young red, membranous, mucronate rarely obtuse. Male fl. 4–8 in axillary and terminal fascicles; buds as large as a pea. *Sepals* orbicular, outer smaller. *Petals* rather larger. *Stamens* numerous (12–20 Beddome), forming a short capitate column; anthers oblong, 2-celled, opening longitudinally. Fem. fl. solitary, terminal, shortly and strictly peduncled. *Staminodes* in 4 masses. *Ovary* 4–8-celled; stigma of as many lobes. *Fruit* spherical, as large as a small orange, purple throughout, not grooved. *Seeds* 5–8, compressed, enclosed in an acid pulp. (*Characters from Roxburgh, &c.*)

I have followed Planchon and Triana and Lanessan in referring the *G. purpurea* of Roxburgh (not of Herb. Wallich) to *G. indica* of Choisy, a plant known from early times as the Brindon of the Portuguese, and cultivated as such in Goa and the Mauritius. It was described by Garcias in 1574, by J. Bauhin in 1623, and by Ray in 1688. Roxburgh states of his *G. purpurea* that it was sent to him by Dr. Berry from a garden, and was supposed to come from the Eastern Archipelago. Graham (Cat. Pl. Bombay) says that *G. purpurea*, Roxb., is the Brindall of the Portuguese, is cultivated in the gardens of Bombay, and found wild in the ravines of Kandalla, &c. The juice of the fruit is used as a mordant, and the expressed oil of the seed is the Kokum oil of the natives, extensively used to adulterate Ghee.

There are in the Hookerian Herbarium specimens from Lambert's Herbarium labelled *purpurea*, Roxburgh, but they are imperfect; their leaves are rather small, elliptic, with very oblique somewhat distant nerves, and resemble those of *G. Cambogia* and *G. Morella*, and are perhaps referable to *G. lanceæfolia.*—*J. D. H.*

5. **G. malaccense,** *Hook. f.*; leaves very coriaceous elliptic acuminate, nerves very fine spreading close-set connected beneath by oblique nervules, male fl. 1 in. diam. stoutly pedicelled fascicled, female 1½–2 in. diam., stamens in a dense stipitate conical column.

Eastern Peninsula; Malacca, *Maingay*. (*G. cornea*, Roxb., Kew distrib. 149.)

Branches stout, 4-angled. *Leaves* 5–7 by 2–2½ in., abruptly acuminate, hardly shining above, brown when dry; petiole ⅓ in. Male fl. on stout pedicels ⅓–¾ in., in terminal fascicles of 4–6. *Sepals* orbicular, concave. *Petals* twice as long, dull-red, broadly ovate, shortly-clawed. *Stamens* very numerous, densely imbricated in a narrow conical or pyramidal mass, filaments very short; anthers adnate, ovoid, 2-celled, some oblong, others broader than long. *Rudimentary ovary* 0. Female fl. solitary, terminal, rose-coloured. *Staminodes* few. *Ovary* globose, 8-celled; stigma sessile, very large, convex, enveloping half the ovary, 8-cleft almost to the concave centre. *Fruit* unknown.—So like *G. spectabilis* that but for the structure of the andrœcium (which is confirmed by Maingay's careful analysis), I should háve hesitated in separating it from that plant, which again differs from *G. cornea* chiefly in the much larger flower. Cumming's 2296 from the same locality (referred by Choisy to *G. venulosa* of the Philippines, and by T. Anderson to *G. cornea*) may be this same plant.—*J. D. H.*

6. **G. Cambogia,** *Desrouss. in Lamk. Encycl.* iii. 701; leaves oblong elliptic or lanceolate dark green beneath, nerves very oblique, male pedicels

$\frac{1}{4}$–$\frac{3}{4}$ in., rudimentary stigma 3–4-lobed or 0, fruit not grooved to the tip. *Roxb. Corom. Pl.* iii. t. 298, *Fl. Ind.* ii. 621; *DC. Prodr.* i. 561; *Wall. Cat.* 4865, 4866, 4861 C, 4863 B; *W. & A. Prodr.* i. 561; *Chois. Guttif. Ind.* 35; *Planch. & Trian. Mem. Guttif.* 177; *Thwaites Enum.* 48; [*Lanessan Mem. Garcin.* 362; *Beddome Flor. Sylvat.* t. 85]. G. zeylanica, *Roxb. Fl. Ind.* ii. 621; *Wall. Cat.* 4867; [*Lanessan Mem. Garcin.* 408]. G. affinis, *W. & A. Prodr.* 101 (not of *Wall. Cat.* 4854). G. elliptica, *Wall. Cat.* 4869.

Mountains of the WESTERN PENINSULA, from Concan to Travancor; CEYLON.

A small erect tree; branches drooping. *Leaves* 2–5 by $\frac{1}{2}$–$1\frac{1}{2}$ in., dark green, shining, hardly coriaceous, shortly acuminate, base acute rarely obtuse; midrib prominent to the middle; veins thick, usually very oblique, $\frac{1}{4}$ in. apart, reticulate; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. MALE fl. in short axillary fascicles; pedicels thickened towards the tip, often reflexed. *Sepals* with narrow membranous margins, outer $\frac{1}{6}$–$\frac{1}{4}$ in. long, inner larger. *Petals* twice as long as the sepals, thinner, oblong, concave. *Stamens* 12–20 or more, adnate to the receptacle into a mass with a prominent centre; free part of filaments $\frac{1}{60}$ in. long. *Rudimentary stigmas* 3–4, very short or 0. HERMAPH. fl. 1–3, terminal and axillary, rather larger than the male; pedicels $\frac{1}{6}$–$\frac{1}{4}$ in. *Stamens* 10–20, filaments unequal, all connate at the base or in unequal bundles. *Stigmatic rays* 8–10-tubercled, free nearly to the base, spreading. *Fruit* the size of a small apple, yellow or red, grooves 6–8, ending about the middle; top flat, depressed, mamilla thick. *Seeds* 6–8; aril succulent.—Roxburgh's unpublished drawing (Herb. Calcutta and Kew) differs from that in the Coromandel plants in the usually axillary female flowers, with few terminal ones, and in the papillose scarcely divided stigma; differences of no specific value. Thwaites (Enum.) states that this yields a yellow insoluble gum, hence valueless as a pigment, but that the acid juice of the ripe fruit is used as a condiment.—[*G. indica,* Chois (DC. Prodr. i. 561), founded on Thomas's *Brindonia indica* (Dict. Sc. Nat. v. 340), is probably this species, but having seen no specimens I do not quote it. See No. 4.]

[The following varieties or species are referred to *G. Cambogia* by Beddome (Fl. Sylv. Gen. xxi.).

VAR. 1. *conicarpa,* Wight Ic. 121 (excl. ♂), Ill. i. 126 (sp.); *Planch. & Trian. Mem. Guttif.* 192; *Lanessan Mem. Garcin.* 53; leaves broader beyond the middle or linear-oblong, fruit ovoid-conical 4-grooved to the top, furrows angular.—Shevagerry hills, *Wight.*

VAR. 2. *papilla,* Wight Ic. t. 960, 961 (sp.); *Planch. & Trian. Guttif. Ind.* 191; *Lanessan Mem. Garcin.* 50; leaves large elliptic, fruit ovoid 4–8-grooved to the top with a terminal mamilla.—Conoor and Sisparah jungles, *Wight.*]

7. **G. Cowa,** *Roxb. Fl. Ind.* ii. 622; leaves broad-lanceolate acute at both ends dark green beneath, male pedicels $\frac{1}{6}$–$\frac{1}{3}$ in., rudimentary stigma 0, fruit grooved to the tip. *DC. Prodr.* i. 561; *W. & A. Prodr.* i. 101; *Chois. Guttif. Ind.* 34; *Planch. & Trian. Mem. Guttif.* 186; *Wall. Cat.* 4863; [*Lanessan Mem. Garcin.* 54.] G. Kydia, *Roxb. l.c.* 623; *Wight. Ic.* t. 113; [G. Kydiana, *Lanessan Mem. Garcin.* 59.] G. Roxburghii, *Wight Ill.* 125 (*excl. syn.* Cambogia Zeylanicæ affinis), *Ic.* t. 104. G. umbellifera, *Roxb.*, *Wall. Cat.* 4864. G. Wallichii, *Chois. l.c.* 37. G. lobulosa, *Wall. Cat.* 4868 A; *Chois l.c.* 36. Oxycarpus gangetica, *Ham. in Mem. Wern. Soc.* v. 344.

EASTERN BENGAL; hills near Monghir; ASSAM; EASTERN PENINSULA; ANDAMAN Islands, *Kurz.*

An erect tree, 60 ft.; trunk straight, simple; branches many, slender, lower reaching the ground; bark dark-grey. *Leaves* 3–5 by 1–2 in.; veins $\frac{1}{10}$–$\frac{1}{6}$ in. apart, slender, regular, inarching with an intra-marginal one. MALE fl. in 3–8-flowered, rarely axillary umbels; pedicels $\frac{1}{6}$–$\frac{1}{3}$ in. *Sepals* $\frac{1}{6}$ in. long, broad-ovate, thick, fleshy, yellow, with pink on both surfaces. *Petals* twice as long, oblong. *Stamens* many; anthers subsessile, 4-celled. HERMAPH. fl. solitary, rarely 2–3, axillary, sessile. *Ovary* subglobose; stigmatic rays spreading, papillose. *Stamens* (sterile) in 4 clusters of 3–8 unequal filaments. *Fruit* the size of a small orange, dark-yellow, 4–8-grooved and celled, depressed above, tip mamillary.—Wallich's Sincapore specimens 4868 B are very imperfect. The specimens under this number in Herb. Linn. Soc. consist of two branches with leaves and solitary terminal female flowers: the five leaves marked B are detached and can hardly be referred to *G. Cowa*, whilst the flowers certainly can.—[Lanessan retains *G. Kydiana* as a distinct species with *G. Wallichiana*, Choisy, and *umbellifera*, Wall., as synonym.]

8. **G. nigro-lineata,** *Planch. mss.*; leaves lanceolate or ovate-lanceolate, acuminate acute at the base ferruginous beneath, male pedicels $\frac{1}{6}$–$\frac{1}{3}$ in., rudimentary stigma 0.

Eastern Peninsula; Malacca, *Griffith* (Kew distrib. 854), and *Maingay* (Kew distrib. 152 and 162).

A tree; branches often knotted; bark dusky. *Leaves* 5–8 by 1$\frac{1}{4}$–3 in., subcoriaceous, tapering to the base; veins many, delicate, $\frac{1}{10}$–$\frac{1}{6}$ in. apart, inarching with an intramarginal one. Male fl. 3–9, fascicled on short axillary woody nodes; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., slender, thickened above. *Sepals* $\frac{1}{12}$ in., fleshy, orbicular. *Petals* a little longer and thinner, concave, reflexed above the middle. *Stamens* in a shortly pedicelled 4-cornered compressed mass; anthers 4-gonal, 4-celled. Female fl. solitary, axillary. *Ovary* ovoid (5–7-celled, *Maingay*); stigma 5–7-lobed, lobes lobulate, papillose. ["Fruit subglobose, with a thick fleshy stipitate discoid apiculus, as large as a walnut, bright orange-yellow."—*Maingay*.]

9? **G. bancana,** *Miquel Flor. Ned. Ind. Suppl.* 494; branchlets very stout, leaves broadly ovate or oblong tip rounded very coriaceous, veins numerous slender, petiole 1 in., male fl. small shortly pedicelled in dense fascicles from axillary cushions that are clothed with lanceolate bracts.

Eastern Peninsula; Malacca, *Maingay* (Kew distrib. 158).—Distrib. Island of Banca.

Branchlets as thick as the little finger, 4-angled, black when dry, nodes very close set. *Leaves* 5–7 by 3–4 in., not shining, narrowed into the petiole, brown when dry, nerves uniform very slender, with oblique sinuous connecting nerves beneath; petiole not very stout. Male fl. $\frac{1}{4}$ in. diam., crowded on every node for a considerable length; pedicels $\frac{1}{4}$ in. long; bracts crowded, $\frac{1}{12}$–$\frac{1}{10}$ in. long, membranous, erect, red-brown. *Sepals* orbicular, outer smaller. *Petals* rather larger than the inner sepals, orbicular, concave, not very coriaceous. *Stamens* forming a quadrate mass, without a rudimentary ovary; anthers small, subsessile, 2-celled, peltate.—I find no difference between this plant and the Banca one except that the leaves are larger and the pedicels rather shorter. A very similar or identical plant is found in Borneo; its remarkable inflorescence and bracts at once distinguish it.—*J. D. H.*

†† *Male flower terminal, solitary or geminate, rarely* 3, *fruit obovoid, unknown in* G. loniceroides.—*Leaves* 2–4 in.

10. **G. lanceæfolia,** *Roxb. Fl. Ind.* ii. 623; leaves narrow-lanceolate acuminate subcoriaceous dark green, flowers $\frac{2}{3}$ in. diam. *Wight Ic.* t. 163; *Wall. Cat.* 4861 A, B; *Chois. Guttif. Ind.* 36; *Planch. & Trian. Mem. Guttif.* 186 [*Lanessan Mem. Garcin.* 48]. G. purpurea, *Wall. Cat.* 4862, and *Chois. l.c.* 36 (*not of Roxburgh*).

Eastern Bengal; in forests of Assam and Silhet.

A small tree; bark dark, rough. *Leaves* 2–4 by $\frac{3}{4}$–1 in., rather thick, tapering at the base; veins few, indistinct; petiole $\frac{1}{4}$–$\frac{3}{4}$ in. Male fl. 1–2, terminal, dark-yellow. *Sepals* $\frac{1}{6}$ in. long, thick, oblong, fleshy. *Petals* smaller, slightly oblique, dark red. *Stamens* about 40, in a globose mass; anthers 4-celled. Female fl. terminal or axillary, rather larger than the male. *Stamens* in 4 bundles of 4–5 each. *Ovary* ovoid; stigmatic rays 6–8, glandularly tubercled. *Fruit* the size of a small plum, obovoid, not grooved, orange-yellow, 6–8-seeded.—[Lanessan refers *G. oxyphylla*, Pl. & Trian., to this species.]

11. **G. loniceroides,** *T. Anders.;* leaves oblong-lanceolate or oblanceolate membranous glaucous beneath, flowers very small $\frac{1}{6}$ in. diam.

Birma, *Griffith* (Kew distrib. n. 870); Pegu, at Tonkye ghat, *Kurz.*

A shrub or small tree; branches slender, decussate, horizontal, old bark dark grey; young shoots reddish purple. *Leaves* 2–4 by $\frac{1}{2}$–$\frac{3}{4}$ in., confined to the young shoots; veins slender, indistinct, irregularly branched and forked; petiole $\frac{1}{4}$ in. Male fl. rarely axillary, usually 3 or more; pedicels slender, $\frac{1}{6}$ in. *Sepals* and *petals* $\frac{1}{14}$–$\frac{1}{12}$ in., thinly fleshy, broad-ovate, concave. *Stamens* many in a central sessile sub-4-gonal mass; anthers subsessile, 2-celled. *Rudimentary ovary* 0.

††† *Male flower in a terminal 3-chotomous panicle; fruit smooth.*

12. **G. pedunculata,** *Roxb. Fl. Ind.* ii. 625; leaves obovate obtuse long-petioled. *Wall. Cat.* 4860; *Wight Ill.* 125, *Ic.* t. 114, 115; *Chois. Mem. Guttif.* 35; *Planch. & Trian. Mem. Guttif.* 192; [*Lanessan Mem. Garcin.* 42].

Forests of N.E. Bengal, near Rungpore and Goalpara, and in Silhet, where it is cultivated for its pleasant acid fruit.

A tree about 60 ft.; bark spongy. *Leaves* 6–12 by 3–5$\frac{1}{2}$ in., subcoriaceous; base acute or acuminate; midrib stout; veins $\frac{1}{2}$ in. apart, regular, parallel, tips inarched and anastomosing; petiole 1–1$\frac{1}{2}$ in. Male fl. large, pale green, in 8–12-flowered panicles; pedicels 2–3 in., stout, erect. *Sepals* $\frac{1}{3}$ in., orbicular, fleshy, inner pair narrower. *Petals* narrower, but scarcely longer, oblong. *Stamens* in a 4-angled truncate shortly stipitate mass; anthers 4-gonal, 2-celled. Female fl. solitary, larger than the male, terminal on a thick 4-angled peduncle $\frac{1}{2}$ in. long. *Stamens* 20–30, filaments in 4 bundles, connate below. *Ovary* globose; stigmatic rays 8–10, spreading. *Fruit* large, yellow, the size of a small melon. *Seeds* 8–10, large, reniform; aril succulent.

†††† *Male flowers several, in sessile terminal heads; fruit echinate.*

13. **G. echinocarpa,** *Thwaites in Hook. Journ. Bot.* vi. (1854) 71; *Enum.* 49; leaves lanceolate oblong or obovate acute or retuse base narrowed. *Planch. & Trian. Mem. Guttif.* 193; [*Beddome Flor. Sylvat.* Gen. xxi. *Lanessan Mem. Garcin.* 33].

Central and Southern provinces of Ceylon.

A tree, 40–50 ft. *Leaves* 3–6 by 1–2$\frac{1}{2}$ in., thickly coriaceous; veins close, regular; petiole stout, $\frac{1}{4}$–1 in. Male fl. small, sessile, pale yellow. *Sepals* thick, orbicular, subcordate. *Petals* twice as long, thinner, oblong, suboblique. *Stamens* 12 or more, on a short sub-4-gonous stalk; anthers subsessile, 4-angled. Female fl. solitary, terminal, sessile. *Stamens* connate in a ring. *Ovary* covered with imbricate fleshy scales; stigma peltate, irregularly lobed. *Fruit* 1$\frac{1}{2}$ in. long, subglobose, dark-red, covered with broad sharp tubercles (like the Litchi fruit), 1–3-seeded.—The thick oil of the seed is used for lamps, but is not good.

Var. 1. Leaves lanceolate-oblong acute, flowers small.—Forests, below 4000 ft.

Var. 2. Leaves thickly coriaceous obovate or oblong retuse or obtuse, flowers large.—A mountain state, alt. 4–6000 ft.

*** Stamens of the male flowers in a subglobose mass; anthers adnate, orbicular, dehiscence circumsciss, rudimentary ovary 0. (Male fl. axillary.)

14. **G. Morella,** *Desrouss. in Lamk. Encycl.* iii. 701, t. 405, f. 2; leaves thickly coriaceous elliptic-obovate to ovate-lanceolate obtuse, veins very oblique, petals longer than the inner sepals. *DC. Prodr.* i. 561; *Planch. & Trian. Mem. Guttif.* 195; *Hanbury in Trans. Linn. Soc.* xxiv. 489, t. 50 [*Beddome Flor. Sylvat.* t. 86; *Lanessan Mem. Garcin.* 62]. G. lobulosa, *Wall. Cat.* 4868. G. pictoria, *Roxb. Fl. Ind.* ii. 627; *Wight Ic.* t. 102 [*Beddome Flor. Sylvat.* t. 87]. G. elliptica, *Wall. Cat.* 4869; *Wight Ic.* t. 120. G. acuminata, *Planch. & Trian. l.c.* 200. G. gutta, *Wight Ill.* 125, t. 144

(*excl. syn. Linn.*). G. cambogioides, *Royle Mat. Med. Ed.* iii. 339. Hebradendron cambogioides, *Graham in Hook. Comp. Bot. Mag.* ii. 199, t. 27.]

Forests of EASTERN BENGAL; the KHASIA MTS.; the WESTERN PENINSULA, in Malabar and Canara, and the EASTERN PENINSULA at Malacca and Sincapore; CEYLON.—DISTRIB. Eastwards to Siam.

A small tree, 30–50 ft. *Leaves* 4–6 by $1\frac{1}{2}$–3 in., base acute, veins indistinct, $\frac{1}{6}$–$\frac{1}{3}$ in. apart; petiole about $\frac{1}{3}$ in., short, stout. MALE fl. about 3, subsessile in the axils of fallen leaves, or on pedicels $\frac{1}{6}$–$\frac{1}{4}$ in. long. *Sepals* $\frac{1}{10}$ in., orbicular, concave. *Petals* similar, but rather larger. *Stamens* many, in an obscurely 4-angled subglobose mass; free portion of filament very short; anthers orbicular, flattened. FEMALE fl. larger than the male, solitary, axillary, sessile or shortly pedicelled. *Staminodes* about 12, bases connate or in a ring. *Ovary* subglobose; stigma large, sessile, 4-lobed, tubercled, lobes toothed. *Fruit* the size of a cherry, subglobose, slightly 4-lobed, 4-celled, 4-seeded.—For an excellent memoir and accurate figure see Hanbury's paper cited above. "The only Ceylon Gamboge-yielding species." *Thwaites.* Much confusion has arisen from Planchon and Triana having examined only imperfect specimens of Wallich's n. 4868. The specimens in the Linnean Society consist of 2 branches, with many attached leaves, a young leaf and a fruit, all certainly belonging to the true *G. Morella.*—[Lanessan adds, as other synonyms, *G. lateriflora*, Blum., and *Gaudichaudi*, Pl. & Trian. Beddome keeps *G. pictoria*, Roxb., distinct from *G. Morella*, Desrouss., on account of difference in the female flower, which he represents as having the staminodes in bundles and the stigma very small, 4-lobed in the centre. He states that the Gamboge has been analyzed by Mr. Broughton, and that it proves equal to that of *G. Morella.*—*J. D. H.*]

15. **G. Choisyana,** *Wall. Cat.* 4870; leaves membranous ovate acuminate, petals twice as long as the sepals. *Planch. & Trian. Mem. Guttif.* 203. Hebradendron Choisyanum, *Chois. Guttif. Ind.* 39.

EASTERN PENINSULA, *Wallich.*

Leaves 4-5 by 2–$2\frac{1}{2}$ in.; veins few, $\frac{1}{2}$–$\frac{3}{4}$ in. apart, alternate, reticulate, anastomosing at the tips; petiole $\frac{1}{2}$ in., slender. MALE fl. solitary?, axillary, sessile. *Sepals* $\frac{1}{6}$ in., broad ovate, scarious. *Petals* obovate, slightly concave. *Stamens* many, in a short mass, free portion of filament short; anthers irregular, more or less orbicular. FEMALE fl. unknown.

16. **G. heterandra,** *Wall. Cat.* 4856; leaves thickly coriaceous ovate obtuse or obtusely acuminate, petals twice as long as the sepals. *Planch. & Trian. Mem. Guttif.* 204. Hebradendron Wallichii, *Chois. Guttif. Ind.* 39.

Forests of PEGU and TENASSERIM, ascending to 4000 ft., *Griffith* (Kew Distrib. n. 874).

Young branches stout, with large axillary flowering nodes. *Leaves* 6–8 by 3–4 in., base tapering; veins $\frac{1}{2}$–1 in. apart, faint, curved; petiole $\frac{3}{4}$–1 in., stout. MALE fl. $\frac{1}{3}$ in. diam., axillary, subsessile. *Sepals* thin, coriaceous, orbicular. *Petals* thick, fleshy. *Stamens* in a globose central mass, free portions of filaments very short; anthers peltate. FEMALE fl. axillary, solitary, sessile. *Immature fruit* subglobose, 4-celled, 4-seeded; stigmatic rays 4, sessile, tubercled.—Choisy describes the male flowers as solitary, but I think the large scarred axillary nodes indicate their being fascicled.

17. **G. Wightii,** *T. Anders.;* leaves coriaceous linear-lanceolate acuminate, petals equalling the sepals.

Forests of SOUTHERN INDIA, *Wight.* (Distrib. Kew, Pl. Wight, 145.)

Leaves 3–5 by $\frac{1}{2}$–1 in.; veins very slender oblique; petioles $\frac{1}{4}$–$\frac{1}{3}$ in. MALE fl. small, sessile, axillary. *Sepals* equal, thinly coriaceous, orbicular, concave. *Petals* obovate, very concave. *Stamens* about 20, in a 4-gonal column enclosing a rudimentary 4-gonal style, filaments free above; anthers peltate, dehiscence oblique. FEMALE fl. solitary, sessile. *Fruit* the size of a small cherry; stigma 4-lobed.—The Gamboge of this species is very soluble, and yields a good pigment.

Series B. Stigma entire.

* Stamens of the male flowers in a globose central mass; anthers 2–4-celled, dehiscing vertically (unknown in 19. *atro-viridis*). Stigma convex.

18. **G. paniculata,** *Roxb. Fl. Ind.* ii. 626; leaves thin oblong-lanceolate or obovate, male fl. in twice or thrice branched panicles, female in short terminal spikes. *Wight Ill.* 125, *Ic.* t. 112; *Wall. Cat.* 4857; *Chois. Guttif. Ind.* 35; *Planch. & Trian. Mem. Guttif.* 194 [*Lanessan Mem. Garcin.* 60]. G. Bhumicowa, *Roxb.*; *Wall. Cat.* 4858.

EASTERN BENGAL; Khasia Mts., ascending to 3000 ft.; EASTERN HIMALAYA, Bhotan, *Booth.*

A tree, about 40 feet; branches many, ascending. *Leaves* 6–9 by 2–4 in., shining, acuminate, rarely obtuse, base tapering; veins ¾ in. apart, curved; petiole ¾ in. MALE fl. many, pure white. *Outer sepals* small, thick, inner ⅒ in. *Petals* 3 times longer, ovate, very concave. *Stamens* many, subsessile, imbricate in a large subglobose mass; anthers obovate, 2–4-celled. FEMALE fl. few, like the males. *Staminodes* 0, or 1–2 filaments. *Ovary* subglobose; stigma convex, entire, tubercled. *Fruit* the size of a large cherry, yellow, succulent. *Seeds* 4, reniform, aril pulpy.

19. **G. atro-viridis,** *Griff. mss.*; leaves coriaceous oblong-lanceolate, female fl. solitary terminal.

UPPER ASSAM, at Tabong, *Griffith.* (Herb. Kew Distrib. 862). MALACCA, *Maingay.*

Young branches stout, terete; bark black when dry. *Leaves* 6–9 by 2–2½ in., thickly coriaceous, dark green, shining, abruptly acuminate, base contracted; veins ⅛ in. apart, prominent on both surfaces, anastomosing along the margin; petiole 1 in. FEMALE fl. large, 1¼ in. diam.; pedicel 1 in. *Sepals* spreading, large, orbicular, concave, blood-red within. *Petals* obovate, fleshy, coloured like the sepals, tip recurved. *Stamens* united below into a ring. *Ovary* subangled, 10-celled; stigma sessile sub-4-gonal, minutely tubercled, broader than the ovary.—"Ovary 9-celled; stigma closely adherent to the ovary, large, orbicular, convex, blood-red, fleshy, margin obscurely lobed. Ripe fruit 3 in. long, subglobose, base slightly 9-lobed, dull yellow, crowned by the at length concave stigma."—*Maingay mss.*

20. **G. Griffithii,** *T. Anders.*; leaves very large ovate or ovate-cordate, obtuse, nerves distant.

EASTERN PENINSULA, Mt. Ophir near Malacca, *Griffith* (Kew Distrib. 361); *Maingay* (Kew Distrib. 153).

A tall tree; young branches 4-gonous, pale green. *Leaves* 12–18 by 4–6½ in., coriaceous; midrib stout, rigid, angled; veins very prominent, ¾ in. apart, tips free. MALE fl. numerous, small, bright yellow, in very short axillary woody branches, pedicels 2 in. *Sepals* ⅒ in. long, concave, fleshy. *Petals* a little larger, oblong, "dull-red," *Maingay.* *Stamens* many, in a sub-4-gonal sessile flattened mass; anthers subsessile, 2-celled. *Rudimentary ovary* 0. FEMALE fl.: "*Ovary* 12-celled; style very short, stigma peltate slightly convex obscurely lobed at the margin, rough with elevated papillæ, persistent. *Fruit* pomiform faintly ribbed, 2 in. in longest diam. *Seed* two-thirds pendulous."—*Maingay.*

[There is in Maingay's Herbarium a plant very like this in habit, but described by him as having a circumsciss anther, which is cultivated at Sincapore as the true Gamboge of Siam.]

** Stamens of the male flower in an annular mass round the rudimentary ovary; anthers 2-celled, dehiscence vertical. Stigma broad, discoid, centre depressed.

21. **G. anomala,** *Planch. & Trian. Mem. Guttif.* 174; leaves coriaceous elliptic or oblong-lanceolate shortly acuminate, male and female fl. in bracteate 3-flowered cymes. [*Lanessan Mem. Garcin.* 30.] G. affinis, *Wall. Cat.* 4854 *in part, not of W. & A.*—Guttifera, *Griff. It. Notes,* 40, No. 654.

Eastern Bengal; Jyntea Hills and Khasia Mts., *Wallich*, &c., in beds of torrents, 3000–5000 ft. elevation. (Kew Distrib. Herb., *Griffith*, 848); (Herb. Ind. Or., H. f. & T. Garcinia, 14).

A small erect tree, branches subverticillate. *Leaves* 4–8 by 2–3½ in., dark green; veins close-set, anastomosing within the margin; petiole ½–¾ in. *Cymes* in the axils of the upper leaves, rather exceeding the petioles; pedicels short, stout; bracts under each flower 2, leafy, ¼ in. long. Male fl.: *Sepals* orbicular, concave. *Petals* ½ in. long, obliquely oblong, suberect, slightly concave. *Stamens* very numerous, mass subglobose concealing the rudimentary ovary; anthers large, horse-shoe shaped. Female fl. like the male, but ⅓ smaller. *Staminodes* many, united into a lobed ring or into bundles. *Ovary* oblong; stigma broad, discoid, edge revolute, slightly lobed. *Fruit* the size of a plum, subglobose, smooth, dark olive-green, crowned by the short-thick style, 1–2-seeded.

22. **G. Maingayi,** *Hook. f.*; leaves 4–6 in., elliptic obtusely apiculate petioled, nerves distant spreading arched distinct, interspaces covered with minute wavy irregular raised points and lines, flowers about ¾ in diam.

Eastern Peninsula, Malacca, *Maingay*, (Kew Distrib. No. 161 ♂ and 160 ♀).

A small tree; branches obtusely angled. *Leaves* coriaceous, very pale-brown when dry, not shining, narrowed into the petiole, which is ½ in. long; nerves ⅓–½ in. apart. Male fl. in terminal fascicles, shortly pedicelled. *Sepals* broader than long, outer smaller than the inner. *Petals* larger than the sepals, shortly clawed. *Stamens* very numerous, filaments connate into a short column; anthers in very many series surrounding a columnar rudimentary ovary with a discoid top, linear, recurved, 2-celled. Female fl. solitary, terminal, subsessile. *Perianth* of the male. *Staminodes* few, slender, inserted on a hypogynous ring. *Ovary* globose, half-concealed by the large convex entire stigma, 4–6-celled.—Maingay describes the stigma as marginally 3–4-lobed, but it appears to be quite entire in the dried specimens.—*J. D. H.*

23. **G. stipulata,** *T. Anders.*; leaves thickly coriaceous elliptic-oblong stipulate, male flowers in 4–6-flowered cymes, female solitary or geminate. Guttifera, *Griff. It. Notes*, 117 n. 261.

Eastern Himalaya, in moist subtropical forests, Bhotan, *Griffith* (Kew. Distrib. 860) Sikkim, ascending to 4000 ft., *J. D. H.* (Herb. H. f. & T. Garcinia, 17.)

A tree, about 60 ft ; bark smooth, branches slender. *Leaves* 6–12 by 1½–3½ in., dark green, thickly coriaceous, yellow-green; midrib and nerves prominent, the latter alternate, distant, incurved, reticulate; petiole ¾ in.; stipules small, triangular. Male fl. 4–6 in each cyme; pedicels ½ in., stout; bracts scale-like. *Sepals* orbicular, concave, outer ⅓ in., inner ¼ in. broad. *Petals* twice as long, obliquely ovate, acute. *Stamens* many, in an annular mass; free portion of filaments very short. Female fl. like the male, axillary, solitary, shortly pedicelled. *Fruit* ¼ in. long, oblong, smooth, shortly pointed, 2-celled and 2-seeded; stigma orbicular, tubercled, margin revolute. *Seeds* flattened, oblong, testa strongly nerved.—Planchon and Triana refer the flowers of the Herb. Ind. Or. H. f. & T. specimens of this to *G. speciosa* (l.c. 172 in note), and state that they cannot reconcile the venation and stipulation of the leaves distributed with them with any *Guttiferæ* but the tribe *Quineæ*, and therefore refer these to a plant of that said tribe. I have however examined the living plant in Sikkim, and it is certain that there was no error in the distribution of the Indian specimens.

*** Stamens of the male flowers in 4 bundles; anther-cells dehiscing by terminal pores, or by 2 erect valves; stigma peltate smooth.

24. **G. merguensis,** *Wight Ill.* 122, *Ic.* t. 116; leaves lanceolate elliptic or ovate with a long obtuse or notched tip, flowers axillary, male cymose, female solitary or in pairs. *Wall. Cat.* 1948. [*Lanessan Mem. Garcin.* 57, *excl. syn.*] Discostigma merguense, *Planch. & Trian. Mem. Guttif.* 208.

Eastern Peninsula; in dense woods from Mergui to Malacca.

A small tree or shrub, young branches sub-4-gonal. *Leaves* 2–4 by 1–1¾ in., thinly coriaceous; veins below very close set, delicate, ending in a stout intramarginal one; petiole ⅙–⅓ in. Male fl. numerous; cymes ¼–⅙ in. long; pedicels ¼ in., 4-gonal *Outer sepals* small, bract-like; inner ⅒ in., thin, membranous, concave. *Petals* like the inner sepals, concave. *Stamens* many, in 4 distinct bundles, each bearing a head of anthers on short filaments; anthers small, 2-celled. *Rudimentary stigma* large fungoid; style equalling the staminal bundles. Female fl. on pedicels ½–1 in. *Fruit* ⅓–½ in. long, oblong, fleshy. *Seed* solitary, subreniform.

25. **G. travancorica,** *Beddome Flor. Sylvat.* t. 173; leaves 2½–3½ in. linear-oblong, tip rounded, base acute, nerves very slender horizontal, surface finely reticulated beneath between them, petiole slender, flowers ½ in. diam. Garcinia, sp. 2, *Beddome Flor. Sylvat. Gen.* xxi.

Western Peninsula, in forests of Travancor and Tinnivelly, *Beddome.*

A large tree, abounding in a yellow pigment; branches obtusely 4-angled, shining. *Leaves* coriaceous, sometimes broader upwards, dark green above, not shining, pale beneath, with a stout reddish (when dry) midrib, and beautifully reticulated surface; margins recurved; petiole ¼–¾ in. Male fl. in 3-chotomous, short, few-flowered terminal and subterminal cymes. *Sepals* orbicular, concave. *Petals* about twice as large, shortly clawed. *Stamens* in 4 large masses; anthers very numerous, versatile, 2-celled, cells longitudinally 2-valved. *Rudimentary ovary* columnar, with a circular peltate stigma. Female fl. terminal, subsolitary. *Perianth* of the male. *Staminodes* few, slender, inserted in a hypogynous ring. *Ovary* globose, half concealed by the large convex obscurely lobed stigma. *Fruit* as large as a walnut, subglobose, contracted into a short thick style with a broad imbricate stigma ⅓ in. diam. *Seeds* few, large, shining.—*J. D. H.*

26. **G. terpnophylla,** *Thwaites Enum.* 406; leaves lanceolate acute or acuminate with an obtuse tip, flowers axillary, male in short subumbellate fascicles, females solitary or in pairs. *Beddome Flor. Sylvat. Gen.* xxi. Terpnophyllum zeylanicum, *Thwaites in Hook. Lond. Journ. Bot.* vi. 70, t. 2, f. 1, *Enum.* 49. Discostigma zeylanicum, *Planch. & Trian. Mem. Guttif.* 209.

Central province of Ceylon, ascending to 4000 ft., *Thwaites.*

A middle-sized tree, young foliage red-purple. *Leaves* 3–5 by 1–1½ in., coriaceous; midrib prominent, veins ⅙ in. apart, inarching at the tips with an intramarginal one. Male fl. ¼ in. diam.; pedicels ⅙ in. *Stamens* many, in 4 [2–4 Beddome] very short spreading bundles, adnate to the basal keel of the petals; anthers sessile. *Rudimentary ovary* a small papilla. Female fl.: *Staminodes* scale-like. *Ovary* 2-celled; stigma peltate, partially lobed. *Fruit* ¾ in. long, obliquely ovoid, 1-celled, 1-seeded.—In the flower I have examined the stamens are in 4 equal bundles, as in its allies of this section, and not on a lobed disk as represented in Journ. Bot. l.c.

Var. *acuminatum;* leaves with a long tapering obtuse point. Discostigma acuminatum, *Planch. & Trian. Mem. Guttif.* 209.

27. **G. eugeniæfolia,** *Wall. Cat.* 4873; leaves broadly lanceolate acute or acuminate, male flowers in short dense axillary cymes, females subumbelled.

Eastern Peninsula; Sincapore, *Wallich* (7491); Malacca, *Griffith, Maingay.*

A small tree very like *G. merguense,* but with large broader leaves, finely and closely veined beneath like a *Calophyllum.* Male fl. as in *merguense* but smaller, in short dense cymes. *Staminal* bundles distinct, suberect, free part of filaments very short; anthers very small. *Style* slender, as long as the stamens. Female fl. in 4–10-flowered short subumbelled cymes. *Sepals* minute, scale-like. *Petals* smaller, margins ciliate. *Staminodes* 0? *Ovary* short, terete; stigma broad, peltate with revolute entire margins.—I cannot agree with Triana and Planchon in referring *Discostigma rostratum,* Haask. to this. Helfer states that the stem exudes a green varnish, and Griffith describes the juice of the fruit as milky.

SUBGENUS II. **Xanthochymus,** *Roxb.* (Gen.). *Sepals* and *Petals* 5, very rarely 4. *Filaments* connate in 5, rarely 4 erect distant pedicelled spathulate bodies, antheriferous at the top, free portions very short, incurved; anthers small didymous.

28. **G. Xanthochymus,** *Hook. f.*; leaves large linear-oblong or oblong-lanceolate acute or acuminate, male fl. fascicled ½ in. diam. shortly pedicelled. Xanthochymus pictorius, *Roxb. Corom. Pl.* ii. 51, t. 196, *Fl. Ind.* ii. 633. X. tinctorius, *DC. Prodr.* i. 562; *Chois. Guttif. Ind.* 32; *Planch. & Trian. Mem. Guttif.* 149; *W. & A. Prodr.* 102; *Wall. Cat.* 4837.

EASTERN BENGAL and the EASTERN HIMALAYA, from Sikkim to the Khasia Mts. and to Birma: EASTERN PENINSULA, Penang and the Andaman Islds.; WESTERN PENINSULA, the Circars, *Roxburgh*, and from the Bombay Ghats southward.

A middling sized tree; trunk straight; branches drooping, angular. *Leaves* 9–18 by 2–4 in., coriaceous, shining, veins ¼–½ in. apart, reticulated; petiole 1 in., rugose. MALE fls. ¾ in. diam., in 4–8-flowered fascicles, from the axils of fallen leaves, white; pedicels thickened, 1–1½ in. *Sepals* ⅙ in., orbicular, concave, fleshy, unequal. *Petals* ⅓ in., orbicular, spreading, thin. *Stamens* in 5 broad bundles of 3–5, alternating with 5 fleshy glands, anthers 2-celled. HERMAPH. fl. like the male. *Ovary* ovoid, pointed, usually 5-celled; stigmatic lobes 5, oblong, spreading, entire. *Fruit* the size of an apple, subglobose, pointed, dark yellow. *Seeds* 1–4, oblong.—Yields a large quantity of indifferent gamboge (Roxburgh). The closely allied *X. dulcis*, Roxb., of the Indian Archipelago has a round-tipped fruit. There are in Helfer's Tenasserim Herbarium imperfect specimens of a plant much resembling this, but with pubesecnt branchlets. "A very variable species in the shape of the leaves, and length of the peduncles and pedicels; it yields a tenacious gum of no value."—*Thwaites.*

29. **G. ovalifolius,** *Hook. f.*; leaves ovate elliptic-oblong or lanceolate or suborbicular retuse obtuse or acute, male fl. spiked or fascicled, sepals ciliolate. Xanthochymus ovalifolius, *Roxb. Fl. Ind.* ii. 632; *W. & A. Prodr.* 102; *Wall. Cat.* 4838; *Chois. Guttif. Ind.* 32; *Planch. & Trian. Mem. Guttif,* 149; *Thwaites Enum.* 49. Stalagmites ovalifolius, *G. Don.*

WESTERN PENINSULA; in forests of the Circars, *Roxburgh;* CEYLON, ascending to 3000 ft.—DISTRIB. Java?

A middling-sized tree. *Leaves* 3¼–8½ by 1¾–3½ in., shining; nerves numerous, slender, arched with many oblique transverse nervules; petiole ¼–½ in. *Flowers* ⅕–⅓ in. diam., ♂ and ♀ often mixed in one fascicle, but usually the females are fascicled and the males often spiked, the spikes sometimes running out to 4 inches long, with fascicles of flowers throughout their length. MALE fl.: *Sepals* 4, coriaceous, orbicular, half as large as the membranous orbicular concave petals. *Stamens* in 5 long-clawed spathulate fascicles; anthers few (6–10) didymous. FEMALE fl. usually on much longer pedicels than the male. *Staminodes* 5, small, with effete anthers. *Ovary* globose, 3–4-celled; style very short; stigma 5-lobed to the middle. *Fruit* broadly oblong; size of a walnut, smooth, deep green, 1–3-seeded.—A very similar species inhabits Java, but has always acute leaves.

VAR. 1. *ovalifolia proper;* leaves obtuse, ♂ flowers fascicled ¼–⅓ in. diam.—Ceylon and Western Peninsula.

VAR. 2. *spicata;* leaves obtuse, ♂ in long or short spikes, flowers as in var. 1. Xanthochymus spicatus, *W. & A. Prod.* 102; *Wall. Cat.* 346 A.—Western Peninsula.

VAR. 3. *macrantha;* leaves obtuse, ♂ flowers large ⅔–1 in. diam. fascicled, anthers 8–12 in each bundle.—Xanthochymus ovalifolius? *Beddome Flor. Sylvat. Gen.* xxi.—Western Ghats.

VAR. 4. *acutifolia;* leaves acute, flowers as in var. 1.

I can detect no further differences than the above between vars. 2, 3, and 4 *G.. ovalifolia.* Beddome states that var. 3 has a different habit.—*J. D. H.*

30. **G. Andersoni,** *Hook. f.*; leaves very large 1–2 ft. oblong thickly coriaceous subacute rounded or cordate at the base, nerves numerous strong, flowers large, fascicled, pedicels very stout long, sepals pubescent.

EASTERN PENINSULA; Malacca, *Griffith*, littoral ("Koondon Belookar"), *Maingay* (Kew distrib. 157, G. macrophylla, *T. And. ms.*)

Branchlets as thick as the middle finger, acutely 4-angled, almost winged when dry green. *Leaves* by far the largest of the genus, often 2 ft. by 9 in., very variable in breadth, nerves very numerous and prominent, meeting in a strong intramarginal one, interspaces reticulate; petiole 1–2 in., very stout. MALE fl. unknown. FEM. fl. ¾ in. diam., in axillary many-flowered fascicles; pedicels very stout, 2 in., seated on a subglobose axillary cushion. *Sepals* 5, intricate, leathery, orbicular, concave, two outer smaller, all minutely pubescent at the back. *Petals* three times as large as the sepals, orbicular, concave, contorted in bud. *Disk* very large, of 5 thick fleshy pitted ciliate glands, between each of which is a minute staminode with about 5 imperfect anthers. *Ovary* globose, narrowed into a distinct style, 4–5-celled; stigma cleft to the base into 4–5 linear-oblong obtuse rays. "*Fruit* very large, pomiform, crowned by the stigma, normally 5-celled," *Maingay*.—This species was incompletely characterized by Dr. Anderson from Griffith's specimens under the mss. name of *Garcinia? macrophylla*; I have now redescribed it from Maingay's more complete specimens, and in so doing given the name of my late friend the monographer of the Indian Guttiferæ to what is certainly by far the noblest species of the genus. Griffith in his notes attached to the specimen, describes the perianth as 4-merous, but I find it is always 5-merous.—*J. D. H.*

DOUBTFUL SPECIES.

G. SUCCIFOLIA, *Kurz in Journ. Beng. As. Soc.* xli. pt. 2, of which the female flower and fruit are not known. It is a native of Martaban.

2. **OCHROCARPUS,** Thouars.

(*Calysaccion*, Wight.)

Trees with coriaceous leaves and axillary polygamous flowers. *Calyx* closed before flowering, at length opening into 2, rarely 3, valves or sepals. *Petals* 4–7 or more. *Stamens* indefinite, filaments filiform, free or shortly connate below; anthers erect, oblong or linear, dehiscence vertical. *Ovary* 2-celled; style short, stout, stigma 3-lobed; ovules 2 in each cell. *Berry* 1–4-seeded. *Seeds* large; embryo of a large fleshy tigellus with the cotyledons reduced to a small mamilla or 0.—DISTRIB. A small genus of W. Africa, Madagascar, and India.

1. **O. longifolius,** *Benth. & Hook. f. Gen. Pl.* i. 980; leaves linear-oblong or oblong-lanceolate obtuse, pedicels fascicled, petals acute. *Beddome Flor. Sylvat.* t. 89. Calysaccion longifolium, *Wight Ill.* i. 130, *Ic.* t. 1999. Mammea longifolia, *Planch. & Trian. Mem. Guttif.* 216. Calophyllum longifolium, *Wall. Cat.* 4851. C. chinense *Walp.? ex Seemann in Bonplandia.*

Forests of the WESTERN PENINSULA from Canara to the Concan.

A middling-sized tree; young branches terete, youngest 4-gonous. *Leaves* 6–8 by 2–2½ in., thickly coriaceous, dark-green, base rounded, midrib stout prominent, veins few, indistinct, very slender, united by innumerable venules which give the dried leaf a very beautifully lacunose appearance; petiole short, stout, ¼ in. *Flowers* ⅝ in. diam., on nodes clothed with subulate bracteoles in the axils of fallen leaves; buds globose; pedicels 1 in., slender. *Calyx* bursting into 2 valves, reflexed during flowering. *Petals* 4, thin, deciduous, white. *Stamens* many. *Style* subulate; stigma broad, discoid. *Fruit* 1 in. long, obliquely ovoid, tipped by the hard pointed style, stipitate, 1-seeded. [Flowers often hermaphrodite in cultivation, and used for dyeing silk.—*Beddome.*]

2. **O. siamensis,** *T. Anders.*; leaves linear-oblong or oblong-lanceolate or oblanceolate obtuse, pedicels 1–2 rarely fascicled, petals rounded at the tip.

Mammea siamensis, *T. Anders. in Journ. Linn. Soc.* ix. 261. Calysaccion siamense, *Miquel in Ann. Mus. Bot. Lugd. Bat.* i. 209.

Dry hills in PEGU and ARRACAN, *M'Clelland, Kurz.*—DISTRIB. Siam.

Very similar indeed to *O. longifolius*, but the flowers are fewer in a fascicle, the petals obtuse, and the fruit narrower and more pointed.—*Flowers* sweet. *Fruit* 1¼ in. long, ovoid, mucronate, glabrous.

3. **CALOPHYLLUM,** Linn.

Trees. *Leaves* opposite, shining, coriaceous, with innumerable parallel slender veins at right angles to the midrib. *Flowers* polygamous, in numerous axillary or terminal panicles. *Sepals* and *petals* 4–12, imbricate in 2–3 series. *Stamens* very many, filaments filiform often flexuous, free or connate below; anthers erect, 2-celled, dehiscence vertical. *Ovary* 1-celled; style slender, stigma peltate; ovule solitary, erect. *Drupe* with a crustaceous putamen. *Seed* erect, ovoid or globose, testa thin, or thick and spongy.—DISTRIB. About 25 species, chiefly tropical Asiatic with a few American.

A. Sepals 4. Petals 0 (or Sepals 2, Petals 2). See also *C. Wightianum.*—APOTERIUM, *Blume Bijd.* 218.

* *Flowers in short racemes, racemes sometimes panicled and terminal, usually axillary.*

1. **C. spectabile,** *Willd.; DC. Prodr.* i. 562; leaves large (6–14 in.) oblong or ovate-oblong acuminate, margins usually undulate, racemes sub-umbellate few-flowered glabrous axillary or in subterminal leafy panicles. *Chois. Guttif. Ind.* 43, *in part; Planch. & Trian. Mem. Guttif.* 238; *Wight Ill.* i. 128. C. tetrapetalum, *Roxb. Fl. Ind.* ii. 608. C. Moonii, *Wight Ill.* i. 129, *Ic.* t. iii.; *Wall. Cat.* 4841 D, 4842, 4843, 4849 C; *Thw. Enum.* 52; *Beddome Flor. Sylvat. Gen.* xxii. C. cymosum, *Miquel Fl. Ind. Bat. Suppl.* i. 497.

Forests of the EASTERN PENINSULA, PENANG, and CEYLON.—DISTRIB. Java, Fiji, and Society Islands.

A tall tree; young shoots 4-gonal, often clothed with rusty tomentum. *Leaves* 6–14 by 2–5 in., base acute; veins many, close-set, equally prominent on both surfaces; petiole ½–1 in., stout. *Flowers* few, ⅓ in. diam., in short racemes. *Sepals* 4, orbicular, *Petals* 0. *Fruits* spherical or ovoid; pedicel 1 in., stout, glabrous.—Roxburgh describes the leaves of *C. tetrapetalum* as being finely serrulate.

2. **C. canum,** *Hook. f.*; leaves (6–7 in.) linear-oblong or oblong-lanceolate shining, racemes in very stout terminal many-flowered hoary-pubescent panicles, pedicels short stout.

EASTERN PENINSULA; Malacca, *Maingay.*

Branches robust, woody, subcylindric. *Leaves* coriaceous, rigid, obtusely acuminate, red-brown when dry, shining on both surfaces, especially above, base acute, margin not thickened, a little waved; nerves extremely close, uniform on both surfaces; petiole ½–¾ in. *Panicles* terminal, of many short opposite stout racemes 1–2 in. long, rachis and branches stout. *Flowers* rather crowded, ¾ in. diam. *Sepals* 4, outer coriaceous broadly ovate obtuse concave, hoary-pubescent externally, inner twice as large orbicular concave, almost membranous. *Petals* 0. *Stamens* excessively numerous, and style equalling the inner sepals; anthers linear.—Very like *C. Wallichii*, but the leaves are apparently never tomentose beneath, and there are no petals.—*J. D. H.*

3. **C. pulcherrimum,** *Wall. Cat.* 4848; leaves 1–2 in. ovate-lanceolate, petiole ¼ in., racemes axillary few-flowered glabrous, pedicels very slender. *Chois. Guttif. Ind.* 41; *Planch. & Trian. Mem. Guttif.* 246. C. gracile *and*

C. bancanum, *Miquel Fl. Ned. Ind. Suppl.* i. 498 and 499, *and* C. plicipes, *ib.* (*according to Kurz in Journ. As. Soc. Bengal*, xxxix. pt. 2, 64). C. mesuæfolium, *Wall. Cat.* 4850.

Eastern Peninsula, Sincapore and Malacca.—Distrib. Sumatra, Banca.

Branches slender, terete, shoots 4 gonal. *Leaves* 1–2$\frac{1}{2}$ by $\frac{3}{4}$–1$\frac{1}{4}$ in., rigid, thin, obtusely acuminate, base tapering acute; veins slender on both surfaces; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., slender. Racemes from the axils of the oldest leaves, slender, glabrous, few-flowered; pedicels $\frac{1}{3}$ in., very slender. *Sepals* all equal, broadly ovate. *Petals* 0.—Of Wallich's *C. mesuæfolium* only a branch with a few leaves are known.

Var. *oblongifolium;* leaves 1$\frac{1}{2}$–2$\frac{1}{2}$ in. oblong, tip rounded. Malacca, *Maingay* (Kew distrib. 173.)

4. **C. Burmanni,** *Wight Ill.* i. 129, *Ic.* t. 107, 188; leaves small (1–2 in.) elliptic-ovate; tip rounded, racemes small axillary few-flowered glabrous. *Planch & Trian. Mem. Guttif.* 233 (*not of Seemann Fl. Viti.*); *Thwaites Enum.* 52; *Beddome Flor. Sylvat. Gen.* xxii.

Hotter parts of Ceylon, at no great elevation.

Young shoots 4-gonal, clothed with ferruginous tomentum. *Leaves* 1$\frac{1}{2}$–2$\frac{1}{2}$ by 1–1$\frac{1}{2}$ in., thinly coriaceous, tip scarcely emarginate, finely and equally veined on both surfaces; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Racemes* slender. *Flowers* scarcely $\frac{1}{4}$ in. diam., pedicels long slender. *Sepals* 4, orbicular-ovate. *Petals* 0. *Fruit* nearly $\frac{3}{4}$ in. diam., sub-globose [reddish-brown, *Beddome*].—Wight's var. *β parvifolium* passes so gradually into the typical form as hardly to deserve recognition as a distinct form.

5. **C. floribundum,** *Hook. f.;* leaves 1–2 in. elliptic-lanceolate obtusely acuminate margin thickened, petiole $\frac{1}{6}$–$\frac{1}{4}$ in., racemes glabrous in most of the axils, pedicels $\frac{1}{6}$–$\frac{1}{4}$ in.

Eastern Peninsula; Malacca, *Maingay.* (Kew distrib. 170, 172, & ? 171.)

Much-branched, everywhere glabrous; branchlets 4-angled, strict. *Leaves* coriaceous, pale when dry, hardly shining, nerves close-set uniform on both surfaces. *Racemes* erecto-patent, about half as long as the leaves, 6–8-flowered, pedicels spreading. *Flowers* $\frac{1}{6}$ in. diam., opposite. *Sepals* 4, outer broadly ovate, subacute, inner broadly obovate, tips rounded, membranous, veined. *Petals* 0. *Stamens* very numerous and style hardly exceeding the sepals. *Fruit* unknown.—*J. D. H.*

6. **C. retusum,** *Wall. Cat.* 4846; leaves 1–2 in. ovate or ovate-oblong, tip rounded, petiole short downy, racemes axillary slender pubescent towards the base. *Chois. Guttif. Ind.* 41 (*excl. synonym*); *Planch. & Trian. Mem. Guttif.* 237. C. amœnum, *Wall. Cat.* 4849. C. Burmanni var. bracteatum, *Wight Ill.* i. 129. C. pisiferum, *Planch. & Trian.* l.c. 266.

Eastern Peninsula, from Martaban to Sincapore, *Griffith,* (Kew distrib. 876, 881.)

An erect much-branched, densely-leafy shrub; shoots clothed with ferruginous down. *Leaves* 1–2 by $\frac{3}{4}$–1 in., coriaceous; veins most prominent on the upper surface; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., downy. *Racemes* in the axils of the lower and fallen leaves, few-flowered, slender, erect; peduncle ferruginous towards the base. *Flowers* small, glabrous. *Sepals* 4, $\frac{1}{6}$ in. long, ovate-oblong. *Petals* 0. *Anthers* minute, ovoid. *Fruit* pisiform, deep yellow, pericarp thin.

** *Flowers solitary or in pairs.*

7. **C. microphyllum,** *T. Anders.;* leaves obovate or cuneate-obovate obtuse or retuse, flowers few glabrous.

Eastern Peninsula, near the top of Mt. Ophir, *Griffith, Lobb, Maingay* (Kew distrib. n. 165).

A glabrous shrub; branches many, short, slender, leafy; shoots 4-gonal. *Leaves* $\frac{3}{4}$–1$\frac{1}{2}$ by $\frac{1}{4}$–$\frac{3}{4}$ in., tapering to the truncate base; veins prominent on both surfaces; petiole $\frac{1}{12}$–$\frac{1}{6}$ in. *Flowers* in the upper axils, minute; pedicels $\frac{1}{6}$–$\frac{1}{4}$ in., slender, recurved, 2 bracteolate at the base. *Sepals* 4, suborbicular, all nearly equal. *Petals* 0. *Fruit* (immature) pisiform, tipped by the persistent style.

B. Sepals 4. Petals 4 (rarely 3, or 0 in *C. Wightianum*, or 8 in *C. cordato-oblongum, cuneifolium* and *Walkeri*).

* *Racemes shorter than the leaves, except* C. polyanthum.

8. **C. inophyllum,** *Linn.; DC. Prod.* i. 562; quite glabrous, leaves oblong or obovate-oblong obtuse or emarginate shining, inner sepals petaloid. *Chois. Guttif. Ind.* 42; *Planch. & Trian. Mem. Guttif.* 254; *Roxb. Fl. Ind.* ii. 606; *W. & A. Prod.* 103; *Wight Ill.* i. 128, *Ic.* t. 77; *Wall. Cat.* 4841 B, C, D, E, F; *Beddome Flor. Sylvat. Gen.* xxii. C. Bintagor, *Roxb. l.c.* 607.

Western Peninsula; from Concan and Orissa southwards; Ceylon; Eastern Peninsula, from Pegu southwards; Andaman Islands.—Distrib. E. African Islands, Malay Archipelago, Australia, Polynesia.—Cultivated throughout India.

A middling-sized tree; bark grey, smooth. *Leaves* 4–8 by 3–4 in., coriaceous, shining on both surfaces; veins many, fine; petiole $\frac{1}{2}$–$1\frac{1}{4}$ in. *Racemes* in the upper axils, loose, 4–6 in. long, shorter than the leaves, lax, few-flowered. *Flowers* $\frac{3}{4}$ in. diam., pure white, fragrant; pedicels slender, 1–2 in. *Sepals* 4. *Petals* 4, like the inner sepals. *Stamens* numerous, filaments in 4 bundles. *Ovary* globose, stipitate; style much exceeding the stamens, stigma peltate lobed. *Fruit* 1 in. diam., globose, smooth, yellow, pulpy.—Rumph and Blume say that the petals are sometimes 6–8. Wood coarse-grained but valuable. Seeds afford lamp oil.

9. **C. Wallichianum,** *Planch. & Trian. Mem. Guttif.* 249; young parts tomentose, leaves long-petioled narrow-oblong acute or obtuse, racemes pubescent on the rachis or throughout, sepals subequal. C. tetrapetalum, *Wall. Cat.* 4843, *not of Roxburgh.*

Eastern Peninsula; from Penang to Sincapore, *Wallich*, &c.

Young *branches* sub-4-gonal, or cylindric, and buds rusty tomentose. *Leaves* 6 by 1–$1\frac{1}{4}$ in., acute or subacute at the base, margins flat or waved; midrib puberulous; veins close-set, somewhat prominent on both surfaces; petiole 1–$1\frac{1}{4}$ in. *Racemes* axillary or terminating short branches, few-flowered, half the length of the leaves, rusty pubescent; peduncle and pedicels glabrous. *Flower* $\frac{3}{4}$ in. diam. *Sepals* ovate-oblong, glabrous or pubescent. *Petals* 4, oblong. *Filaments* slender. *Ovary* ovoid, glabrous. *Fruit* globose, size of a cherry.—Griffith's Malacca, 880, may be this, but consists of a young flowerless branch only, the leaves are rusty-pubescent beneath, as are Maingay's

10. **C. Griffithii,** *T. Anders.*; quite glabrous, leaves oblong or elliptic-oblong acute or obtuse, veins stout with a strong intramarginal one, racemes glabrous, sepals subequal.

Eastern Peninsula; Malacca, *Griffith.*

A glabrous tree; young shoots 4-gonal, older cylindric. *Leaves* 4–6 by $1\frac{1}{2}$–2 in., tip often rounded, base acute, coarsely veined on both surfaces; petiole $\frac{1}{2}$ in. *Racemes* axillary, few-flowered, glabrous, much shorter than the leaves. *Flowers* $\frac{1}{3}$ in. diam., glabrous. *Petals* 4.

11. **C. macrocarpum,** *Hook. f.*; quite glabrous, leaves linear-oblong or elliptic-lanceolate obtusely acuminate narrowed into a slender petiole, racemes not half the length of the leaves, pedicels 1–$1\frac{1}{4}$ in., flowers 1 in. diam., petals narrow much longer than the sepals.

Eastern Peninsula; Malacca, *Maingay* (*C. Griffithii*, Kew distrib. 174).

Branches robust; branchlets sharply 4-angled. *Leaves* 3–5 by $1\frac{1}{2}$–2 in., very coriaceous, shining above, hardly so beneath; nerves very strong; petiole 1–$1\frac{1}{4}$ in. *Racemes* axillary, 2–4 in. long, 6–10-flowered; rather minutely puberulous. *Sepals* 4, 2 outer broadly oblong, obtuse, very concave; 2 inner twice as long, petaloid, oblong, obtuse.

Petals 4, much longer than the inner sepals, linear-spathulate. *Stamens* very short, *Fruit* (according to Maingay's drawing) 5 in. long, ellipsoid, narrowed at both ends, smooth.—*J. D. H.*

12. **C. polyanthum,** *Wall. Cat.* 4844; quite glabrous, leaves lanceolate acuminate, margins waved, racemes terminal glabrous, outer sepals very small. *Chois. Guttif. Ind.* 43; *Planch. & Trian. Mem. Guttif.* 250.

EASTERN BENGAL; Khasia Mts. ascending to 3000 ft.; Pegu, *Kurz.*

A glabrous tree, 60 ft., twigs 4-gonal, compressed. *Leaves* 4–6 by $1\frac{1}{4}$–$1\frac{1}{2}$ in., coriaceous; veins equally distinct on both surfaces; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* many-flowered, equalling the leaves; the upper together forming a terminal panicle. *Flowers* $\frac{1}{3}$ in. diam. *Outer sepals* suborbicular, inner twice as long, petaloid. *Petals* rather longer than the inner sepals, obovate, concave, reflexed. *Fruit* the size of a small plum, subglobose, not pointed.

13. **C. tomentosum,** *Wight Ill.* i. 128, *Ic.* t. 110; young parts tomentose, leaves elliptic or linear-lanceolate acuminate, margin waved, racemes pubescent, outer sepals smaller than the inner. *Planch. & Trian. Mem. Guttif.* 241; *Beddome Fl. Sylvat. Gen.* xxii. C. elatum, *Beddome l.c.* xxii. *and* t. 2.

Moist forests in the WESTERN PENINSULA from the Concan southwards; and in CEYLON, ascending to 5000 ft.

A tall straight tree; branches 4-angled; buds, shoots, panicles and outer sepals clothed with rusty tomentum. *Leaves* 3–5 by $1\frac{1}{4}$–2 in., coriaceous, shining; veins many, close-set, slender, equally prominent on both surfaces; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., often downy. *Racemes* from the axils of the upper leaves, sometimes collected into a terminal panicle, lax, many-flowered. *Flowers* upwards of $\frac{1}{2}$ in. diam.; pedicels long, slender. *Sepals* orbicular. *Petals* 4, ovate-oblong, larger than the sepals. *Fruit* $\frac{3}{4}$ in. long, obliquely ovoid, pointed.—Yields the Poon-spars of Western India, and the seeds an abundant oil in Ceylon.

14. **C. bracteatum,** *Thwaites Enum.* 51; young parts tomentose, leaves elliptic- or obovate-lanceolate acuminate, racemes glabrous few-flowered bracteate, sepals obovate, petals oblong-lanceolate. *Planch. & Trian. Mem. Guttif.* 252; *Beddome Fl. Sylvat. Gen.* xxii.

Near streams in the Saffragam district of CEYLON, *Thwaites.*

A large tree, closely resembling *C. Tomentosum. Leaves* dimorphic, the fully developed 3–8 in. long, tapering to the obtuse base, highly polished, golden brown when dry; petiole $\frac{1}{4}$–$\frac{1}{2}$ in.; abnormal or undeveloped leaves 1–2 by $\frac{1}{6}$–$\frac{1}{3}$ in., subsessile, linear-lanceolate or linear, pubescent, resembling bracts. *Racemes* in the axils of and shorter than the normal leaves, few-flowered. *Flowers* $\frac{1}{3}$ in. diam.; pedicels with an oblong bract $\frac{1}{4}$ in. long at the base. *Sepals* 4. *Petals* 4. *Fruit* $\frac{3}{4}$ in. long, oblong.—Flowers not in a good state for examination.

15. **C. Wightianum,** *Wall. Cat.* 4847; young shoots often pruinose, leaves obovate or oblong-cuneate, racemes axillary glabrous, sepals subequal, petals usually 0. *Planch. & Trian. Mem. Guttif.* 228; *Beddome Flor. Sylvat.* t. 90. C. spurium, *Chois. in DC. Prod.* i. 563; *W. & A. Prod.* i. 103. C. decipiens, *Wight Ill.* i. 128, *Ic.* t. 106, *not of Thwaites; Wall. Cat.* 4841 A, G.

Mountains of the Western Coast of the WESTERN PENINSULA from the Concan to Travancor.

Young shoots 4-gonal. *Leaves* 2–4 by $1\frac{1}{4}$–2 in., rigidly coriaceous, rounded and usually retuse at the tip; veins most prominent on the under surface; petiole $\frac{1}{6}$ in. *Racemes* from the axils of all the leaves and scars of a few fallen ones, several-flowered, shorter than the leaves; peduncles and pedicels slender. *Flowers* $\frac{1}{4}$ in. diam. *Sepals* 4, very thin, strongly veined. *Petals* 0 (or 4 small ones visible in the bud, *Wight*).

Fruit ¾ in. long, ellipsoid.—I have never found petals in any of the buds I have opened.

** *Racemes longer than the leaves, or equalling them.* (*See also* C. polyanthum.)

16. **C. trapezifolium,** *Thwaites Enum.* 51; glabrous, leaves small ovate or rhomboid, racemes few-flowered glabrous 2–3 times longer than the leaves. *Planch. & Trian. Mem. Guttif.* 254; *Beddome Flor. Sylvat. Gen.* xxii.

Central province of Ceylon, from 4–5000 ft., *Thwaites.*
A tall tree. *Leaves* 1½–2 by 1 in., coriaceous, tip rounded retuse or shortly acuminate; veins fine, equally prominent on both surfaces; petiole ¼ in. *Racemes* in the upper axils; pedicels ⅓ in. *Flowers* ½ in. diam. *Outer sepals* smaller than the inner. *Petals* 4, 2 outer larger than the inner. *Fruit* ¾ in. diam., subspherical.

17. **C. Thwaitesii,** *Planch. & Trian. Mem. Guttif.* 232; glabrous, leaves obovate or orbicular base rounded or cordate, racemes axillary glabrous several times longer than the leaves. *Thwaites Enum.* 407; *Beddome Flor. Sylvat. Gen.* xxii. C. decipiens, *Thwaites Enum.* 51, *not of Wight.*

Mountains of Ceylon, ascending to 3000 ft., *Thwaites.*
Twigs stout, 4-angled. *Leaves* 2–3 by 1–2 in., very thick and leathery; veins coarse, very prominent above, less so beneath; petiole 1/12 in. *Racemes* rather slender, few-flowered. *Sepals* 4, obovate. *Petals* 3–4, oblong, longer than the sepals. *Anthers* half the size of those of *C. Wightianum.* *Fruit* subspherical.

18. **C. cordato-oblongum,** *Thwaites Enum.* 407; young parts pilose, leaves oblong-cordate obtuse, panicles terminal as long as the leaves pubescent, outer sepals twice as long as the inner. *Beddome Flor. Sylvat. Gen.* xxii.

At Hinidoon Pattoo in Ceylon, *Thwaites.*
A lofty tree; twigs stout, 4-angled; young shoots petiole and pedicels covered with deciduous rusty hairs. *Leaves* 4–6 by 2–3 in., very thickly coriaceous, obtuse, equally veined on both surfaces; petiole ⅙–¼ in. *Peduncles* and pedicels pubescent. *Flowers* 1 in. diam. *Sepals* rounded, outer ¼ in. long, inner petaloid, twice as long. *Petals* 4–8, ½ in., orbicular.

19. **C. cuneifolium,** *Thwaites Enum.* 51; glabrous except the buds, leaves small obovate or cuneate-spathulate obtuse or retuse, racemes axillary equalling or exceeding the leaves glabrous, outer sepals smaller than the inner. *Planch. & Trian. Mem. Guttif.* 261; *Beddome Flor. Sylvat. Gen.* xxii.

At Madamahanewera in Ceylon, alt. 3–4000 ft., *Thwaites.*
A large tree; leaf-buds and rachis of racemes covered with short brown down. *Leaves* 1–1¾ by ½–1 in., thick and leathery; veins stout and prominent on both surfaces; petiole ¼–½ in. *Racemes* 10 or more-flowered. *Flowers* about ¼ in. diam. *Sepals* 4. *Petals* 4–8, inner the smallest. *Fruit* spherical, ¾ in. diam.

20. **C. Walkeri,** *Wight Ill.* i. 128, t. 45; quite glabrous, leaves obovate tip rounded or retuse, racemes in the axils of the upper leaves often collected into a terminal panicle glabrous, outer sepals shorter than the inner. *Planch. & Trian. Mem. Guttif.* 263; *Beddome Flor. Sylvat. Gen.* xxii. C. decipiens, *Wight Ill.* i. 128.

A large tree; twigs stout, terete, erect. *Leaves* 1–1½ in long, almost as broad, rigidly coriaceous, crowded, veins strong; petiole ⅙ in., very stout. *Flowers* large, pale rose-coloured or white; pedicels 1 in., very stout; buds globose. *Outer sepals* very small. *Petals* usually 8, larger than the sepals; inner smaller. *Style* equalling the stamens, stigma fleshy peltate. *Fruit* size of a cherry, globose.—This tree is said to flower once in 3–4 years; its seeds yield an oil used for burning.

DOUBTFUL SPECIES.

C.? MARGINATUM, *Wall. Cat.* 4845.—Does not exist in any herbarium accessible to me.

C. SURIGA, *Buch. Ham; ex. Roxb. Fl. Ind.* ii. 608. Calophyllum Soulattri, *Burm.* Fl. Ind. 121, with linear-oblong polished leaves and flowers whorled below them, is quite unknown to me.

C. ANGUSTIFOLIUM, *Roxb. Fl. Ind.* ii. 608; "twigs cylindric, leaves short-petioled lanceolate with lengthened subotuse points lucid finely veined, flowers in axillary fascicles, pedicels with a cyathiform tip."—Prince of Wales Island, where called Peon, and yields spars, *Roxb.*

4. KAYEA, Wall.

Trees. *Leaves* opposite; veins rather distant, arched. *Flowers* hermaphrodite, either large and solitary, or small and collected in terminal panicles. *Sepals* and *Petals* 4 each, imbricate. *Stamens* numerous, filaments slender, free or connate at the base; anthers small, subglobose, 2-celled, dehiscence vertical. *Ovary* 1-celled; style slender, stigma acutely 4-fid; ovules 4, erect *Fruit* subdrupaceous, fleshy, indehiscent, 1–4-seeded. *Seeds* thick, testa thin and crustaceous.—DISTRIB. Tropical Asia, 4 species.

1. **K. floribunda,** *Wall. Pl. As. Rar.* iii. 5, t. 210; *Cat.* 4840; leaves oblong or linear-oblong acuminate cuspidate, panicle lax many-flowered, pedicels 2-bracteolate.

Dense tropical forests of the EASTERN HIMALAYA, in Sikkim, and the KHASIA MTS., ascending to 3000 ft.

A tall straight glabrous tree; branches cylindric. *Leaves* 5–8 by 1–1½ in., thickly coriaceous, base acute; veins ⅓–1 in. apart, slender, arched, prominent on the under surface, faint on the upper; petiole 1 in., slender, cylindric. Panicle 6 in. long, terminal; branches and pedicels with 2 opposite bracts or bracteoles at their bases. *Flowers* 1 in. diam. *Outer sepals* ¼ in. long, suborbicular, truncate. *Petals* a little longer than the sepals, thin but fleshy, white, edges rosy. *Stamens* many, filaments capillary, exceeding the sepals. *Fruit* the size of a chestnut, covered by the thick accrescent yellow rugose calyx, tipped by the slender style, 1-seeded.

2. **K. racemosa,** *Planch. & Trian. Mem. Guttif.* 269; leaves oblong-lanceolate acuminate cuspidate, racemes short few-flowered, pedicels ebracteolate. Mesua singaporiana, *Wall. Cat.* 4836.

EASTERN PENINSULA; at Sincapore, *Wallich;* Malacca, *Maingay* (Kew distrib. 177).

A glabrous tree; branches cylindric; bark ashy. *Leaves* 4–5 by 1½ in., thin, rigid; petiole ½ in., terete. *Racemes* short, axillary and terminal; pedicels stout. *Outer sepals* thick, rugose. *Immature fruit* as large as a filbert, tipped with the short subulate style.—Only one specimen seen, in the Linnæan Society's Herbarium, and assumed to be the plant published by Planchon and Triana from a specimen without habitat in De Candolle's Herbarium.—[Maingay's specimens have slender whorled branchlets, each with leaves at the end. Leaves 6–9 by 1½–2½ in., elliptic-oblong, coriaceous, not polished, nerves beneath many, strong, arched, about ½ in. apart; petioles ½–⅝ in. Racemes few, short (1 in.), crowded on the tips of the branchlets between the two leaves; peduncles and pedicels very short, bracts small ovate deciduous. Flowers ¼ in. diam. Sepals very thickly coriaceous. Petals about twice as long. Stamens in 1 series, very numerous, monadelphous at the base.—*J. D. H.*]

3. **K. stylosa,** *Thwaites Enum.* 50; leaves ovate-lanceolate acuminate cuspidate, racemes erect few flowered equalling the leaves, pedicels minutely

bracteolate. *Beddome Flor. Sylvat.* t. 102. K. cuspidata, *Planch. & Trian. Mem. Guttif.* 268.

Southern districts of Ceylon, *Thwaites.*

A large glabrous tree; bark dark-grey; branchlets terete, reddish. *Leaves* 2–3 by $\frac{1}{2}$–1 in., rigid; veins arched, very faint on both surfaces; petiole $\frac{1}{6}$–$\frac{1}{4}$ in., slender. *Racemes* from the upper axils, bracteoles subulate. *Flowers* small. *Stamens* many, filaments capillary, persistent, exceeding the sepals. *Fruit* the size of a small chestnut, covered by the coriaceous accrescent calyx, tipped by the thickened short style.

4. **K. nervosa,** *T. Anders.*; leaves elliptic-oblong or oblong-lanceolate acuminate cuspidate, flowers solitary or 1–3 axillary or terminal. Mesua nervosa, *Planch. & Trian. Mem. Guttif.* 279.

Tenasserim provinces, at Mergui and Martaban, *Griffith, Parish.* Malacca, *Maingay.*

Young branches minutely tubercled, sub-4-angular? *Leaves* 4–5 by 1$\frac{1}{2}$–2 in., thin, membranous, base rounded, shining above, coppery beneath; veins distinct, $\frac{1}{4}$ in. apart, arched, depressed on the upper surface; petiole $\frac{1}{6}$ in. *Flowers* 1$\frac{3}{4}$ in. diam., pedicels 1–2$\frac{1}{2}$ in., tubercled. *Outer sepals* $\frac{1}{4}$ in., thick and coriaceous, suborbicular, inner nearly twice as large. *Petals* cuneate-obovate. *Filaments* capillary, nearly equalling the pistil. *Style* slender, thickened after flowering, stigma deeply 4-cleft.

5. MESUA, Linn.

Trees. *Leaves* opposite, rigidly coriaceous, often pellucid-dotted; veins innumerable, very slender, at right angles to the midrib. *Flowers* polygamous or hermaphrodite, large, axillary, solitary. *Sepals* and *Petals* 4 each, imbricate. *Stamens* very numerous, filaments filiform free or connate at the base; anthers erect, oblong, 2-celled, dehiscence vertical. *Ovary* 2-celled; style long, stigma peltate; ovules 2 in each cell, erect. *Fruit* between fleshy and woody, 1-celled by the absorption of the septum, at length 4-valved, 1–4-seeded. *Seeds* without an aril, testa fragile.—Distrib. Tropical Asia; 3 species.

1. **M. ferrea,** *Linn.*; *DC. Prodr.* i. 562; leaves drooping linear-lanceolate acute or acuminate, peduncles short stout. *Chois. Guttif. Ind.* 40; *Planch. & Trian. Mem. Guttif.* 271; *Roxb. Fl. Ind.* ii. 605; *W. & A. Prodr.* 102; *Wall. Cat.* 4834; *Wight Ill.* 127, *Ic.* t. 118; *Beddome Flor. Sylvat. Gen.* xxiii. M. speciosa, *Chois. in DC. l.c.*; *Guttif. Ind.* 40; *Wight Ic.* t. 961; *Wall. Cat.* 4835: *Beddome l.c.* xxiii. M. pedunculata *Wight Ill.* 127, *Ic.* t. 119. M. coromandeliana, *Wight Ill.* 129, *Ic.* t. 117; *Beddome Flor. Sylvat.* t. 64. M. Roxburghii, *Wight Ill.* 127; *Beddome l.c.* xxiii. M. salicina, M. Walkeriana *and* M. pulchella, *Planch. & Trian. l.c.* 373, 374, and 379. M. sclerophylla, *Thwaites Enum.* 407; *Beddome l.c.* xxiii. M. Nagana, *Gard. in Calc. Journ. Nat. Hist.* viii. 4.

Mountains of Eastern Bengal, the Eastern Himalaya, and the Eastern and Western Peninsulas, and Andaman Islands; cultivated elsewhere in India.

A middling-sized glabrous tree; trunk erect, straight; twigs slender, sub-4-angled. *Leaves* 3–6 by 1$\frac{1}{2}$ to 1$\frac{3}{4}$ in., base acute or rounded, dark-green and shining above, covered more or less with fine waxy meal beneath; veins very fine, close-set, and equally inconspicuous on both surfaces; petiole $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* $\frac{3}{4}$–3 in. diam., usually terminal and solitary or in pairs. *Sepals* orbicular, thick, with membranous margins, inner pair largest. *Petals* 4, spreading, cuneate-obovate, pure white. *Anthers* large, oblong, golden-yellow. *Fruit* ovoid, conical-pointed, size variable, often of a large chestnut; base surrounded by the persistent sepals, 1–4-seeded. *Seeds* dark-brown, testa smooth. —A very variable plant, the absence of the pruinose under-surface of the leaves is by no means confined to the small-flowered states from S. India, to which the name of *coromandeliana* has been applied; the latter is a small and distinct-looking form.

2. **M. Thwaitesii,** *Planch. & Trian. Mem. Guttif.* 277; leaves linear-oblong acute or acuminate, flowers subsessile. M. speciosa var. *a*, *Thwaites Enum.* 50, *not of Choisy.*

Banks of streams in the Ratnapoora district, CEYLON, *Thwaites.*

A tree resembling *M. ferrea*, but distinguished by the form of the leaves and large sessile or subsessile flowers. *Leaves* 8–12 by 1¾–2 in., base acute, glaucous and faintly nerved beneath. *Flowers* nearly 4 in. diam., axillary, solitary or in pairs.

3. **M.? lepidota,** *T. Anders.*; leaves elliptic- or oblong-lanceolate acuminate, racemes terminal.

EASTERN PENINSULA; Malacca, *Griffith* (distrib. Kew, No. 845, named *M. speciosa* by error).

Branches short, rather slender, terete. *Leaves* coriaceous, 2½–3½ by ¾–1¼ in., shortly cuspidate, tapering to the obtuse base; veins very numerous, close set, fine, equally faint on both surfaces. *Flowers* unknown. *Fruit* size of a chestnut, subglobose, pointed, subtended by the thickened obtuse sepals, valves thick, surface rugulose as if scurfy. *Seed* with a brown brittle testa.—Probably a new genus between *Kayea* and *Mesua*, on account of the small woody non-accrescent sepals.

6. PŒCILONEURON, Beddome.

(W. T. Thiselton Dyer.)

Trees. *Leaves* opposite, smooth, coriaceous, with close-set spreading lateral veins, minutely reticulated. *Flowers* yellowish-white, in a terminal panicle, or solitary at each node. *Sepals* 4–5, small, imbricate. *Petals* 5–6, contorted. *Stamens* numerous, free or slightly connate at the base, filaments short or 0; anthers basifixed, narrow-linear, erect. *Ovary* 2-celled; styles 2, subulate, stigmas punctiform; ovules 2 in each cell, ascending from the base. *Capsule* ovoid, 1-celled, septicidal?, with a single erect seed, albumen 0; cotyledons fleshy; radicle minute, inferior.—DISTRIB. S. India; species 2.

1. **P. indicum,** *Bedd. in Journ. Linn. Soc.* viii. 267, t. 17; *Flor. Sylvat.* t. 3; flowers in a pyramidally spreading terminal panicle 4 in. long, sepals and petals each 5, anthers lobulated.

WESTERN PENINSULA; on the west slopes of the Ghats, from South Canara to Malabar, alt. 3–4000 feet., *Beddome.*

A large tree. *Leaves* 4–10 by 1½–2½ in., elliptic, with a long acumination, petioled. *Peduncles, pedicels,* and *sepals* slightly puberulous. *Flowers* ¾ in. diam., yellowish white. *Fruit* ellipsoid.

2. **P. pauciflorum,** *Bedd. Flor. Sylvat.* t. 93; flowers about 4 together and terminal or solitary at each node, sepals 4 the 2 innermost larger, petals 6, anthers simple.

WESTERN PENINSULA; Travancor, alt. 4–5000 ft., *Beddome.*

A tree with red wood. *Leaves* about 5 by 1½ in., narrowly elliptic. *Petals* oblong, obtuse. *Fruit* 1 in. long, ½ in. diam., at first obpyriform, finally ovoid and rather smaller than in *P. indicum.*

ORDER XXIV. **TERNSTRŒMIACEÆ.**

(By W. T. Thiselton Dyer, F.L.S.)

Shrubs rarely climbing, or trees. *Leaves* alternate, simple (in Indian species) entire or often serrate, usually coriaceous, exstipulate. *Flowers* handsome, seldom small, usually subtended by 2 sepal-like bracts, rarely diclinous, axillary, 1 or more together, rarely in lateral or terminal racemes or panicles. *Sepals* 5, rarely 4–7, free or slightly connate, the innermost often larger. *Petals* 5, rarely 4–9, free or connate below, imbricate or contorted. *Stamens* numerous (definite in *Sladenia* and *Stachyurus*) free or connate, usually adnate to the base of the deciduous corolla; anthers basifixed or versatile, dehiscing by slits or rarely by terminal pores. *Ovary* free ($\frac{1}{2}$-inferior in *Anneslea*), sessile, 3–5-celled, (many-celled in *Actinidia*); styles as many, free or connate, stigmas usually small; ovules 2–∞ in each cell, rarely solitary, never orthotropous. *Fruit* baccate or capsular. *Seeds* few or numerous, placentas axile, albumen scanty or 0, rarely copious; embryo straight or hippocrepiform, cotyledons various.—DISTRIB. Rare in temperate, abundant in tropical Asia and America, almost wanting in Africa and entirely in Australasia; species about 260.

TRIBE I. **Ternstrœmieæ.** *Peduncles* 1-flowered (many-flowered in *Sladenia*). *Petals* imbricate. *Stamens* adherent to the base of the corolla; anthers basifixed. *Fruit* (in Indian Genera) indehiscent. *Seeds* usually few, albumen fleshy usually scanty. *Embryo* curved; cotyledons shorter than the radicle and about as broad.

* *Fruit inferior.*

1. ANNESLEA.

** *Fruit superior.*

Flowers hermaphrodite (except *Ternstrœmia penangiana*).
  Anthers glabrous . . . . 2. TERNSTRŒMIA.
  Anthers usually pilose.
    Stamens about 12, ovary 3-celled . . . . 3. SLADENIA.
    Stamens many, seeds numerous, ovary 3–5-celled . . . . . . 4. ADINANDRA.
    Stamens many, seeds moderate, ovary 2–3 celled . . . . . . 5. CLEYERA.
Flowers diœcious . . . . 6. EURYA.

TRIBE II. **Sauraujeæ.** *Peduncles* many-flowered. *Petals* imbricate. *Anthers* versatile. *Fruit* usually pulpy, rarely sub-dehiscent. *Seeds* numerous minute, albumen abundant. *Radicle* straight or slightly curved and longer than the cotyledons.

* *Flowers 5-merous, stamens many.*

Styles many . . . . 7. ACTINIDIA.
Styles 3–5. . . . . 8. SAURAUJA.

** *Flowers 4-merous, stamens few.*

9. STACHYURUS.

TRIBE III. **Gordonieæ.** *Peduncles* 1-flowered, often very short. *Petals* imbricate. *Anthers* versatile. *Fruit* indehiscent or loculicidal. *Albumen* scanty or 0. *Cotyledons* various; radicle short, straight or curved.

* *Fruit indehiscent.*

11. PYRENARIA.

** *Fruit dehiscent.*

Seeds winged, radicle inferior . . . . 10. SCHIMA.
Seeds winged, radicle superior . . . . 12. GORDONIA.
Seeds wingless . . . . 13. CAMELLIA.

TRIBE IV. **Bonnetieæ.** *Flowers* in terminal panicles, rarely lateral and solitary or racemose. *Petals* contorted. *Anthers* versatile or basifixed. *Fruit* indehiscent or septicidal; albumen scanty or 0. *Embryo* straight, cotyledons flat; radicle short.

Ovary 5-celled . . . . 14. ARCHYTÆA.

Pœciloneuron is referred to *Guttiferæ*. (p. 278.)

1. **ANNESLEA,** Wall.

Evergreen trees with the habit of *Ternstrœmia*. *Flowers* axillary and forming sub-terminal umbellate corymbs, rather large, white. *Sepals* 5, connate into a tube which is finally fleshy and adherent to the ovary. *Petals* 5, connate. *Stamens* many, scarcely adherent to the corolla; anthers with a long apiculus. *Ovary* $\frac{1}{2}$-immersed in the torus, 3-celled; style 3-fid; ovules many, pendulous from the top of the cells. *Fruit* baccate, leathery, inferior, crowned by the sepals. *Seeds* oblong with a horse-shoe-shaped cavity, testa osseous, albumen fleshy.—DISTRIB. Malay Peninsula; species 2.

1. **A. fragrans,** *Wall. Cat.* 598; *Plant. As. Rar.* i. 5, t. 5; peduncles about twelve in each corymb $2\frac{1}{2}$–3 in. slender with 2 ovate obtuse bracts. *Griff. Notul.* iv. 567, t. 585 A, f. 17.

EASTERN PENINSULA; Moulmein and Martaban, *Wallich*, &c.

A tree 30 ft. *Leaves* $3\frac{1}{2}$–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., elliptic-oblong, acute or obtuse; petioles $\frac{3}{4}$–1 in. *Sepals* $\frac{1}{2}$ in., cordiform, acute. *Fruit* 1 in. diam. *Seeds* with a thin scarlet fleshy envelope.

2. **A. crassipes,** *Hook. ex. Chois. Mem. Ternstr.* 41; peduncles 3–6 in each corymb about 1 in. rather thick with 2 small ovate acute fleshy bracts.

EASTERN PENINSULA; Mt. Ophir, Malacca, *Griffith*, &c.—DISTRIB. Philippine Islds.

A tree. *Leaves* 2–$4\frac{1}{2}$ by $1\frac{1}{4}$–2 in., lanceolate elliptic or oblanceolate, crenulate, acute or obtuse; petioles $\frac{1}{2}$–1 in. *Flowers* as in *A. fragrans* but drooping. *Sepals* $\frac{1}{3}$ in., orbicular, acute. *Fruit* $\frac{3}{4}$ in. diam.

2. **TERNSTRŒMIA,** Linn.

Glabrous evergreen trees or shrubs. *Leaves* leathery, entire or crenate-serrate. *Peduncles* lateral, recurved, 2-bracteate below the flower. *Sepals* 5. *Petals* 5, connate at the base. *Stamens* many; anthers glabrous. *Ovary* 2–3-celled; style simple, often 0, stigma broadly 2–3-lobed or subentire; ovules 2 in each cell, rarely 1 or 3–6, pendulous from the apex. *Seeds* as in *Anneslea* but the albumen sometimes evanescent.—DISTRIB. Trop. Asia and America; species 25.

* *Anthers* apiculate.

1. **T. japonica,** *Thunb. in Trans. Linn. Soc.* ii. 335; a tree about 20 ft., leaves oblong-obovate petioled, style subentire, stigma 2-lobed, fruit globose. Cleyera japonica, *Thunb. Fl. Jap.* 224 (*not of Sieb. & Zucc.*).

EASTERN BENGAL and PENINSULA, from the Khasia Mts., alt. 4–5000 ft. to Moulmein. WESTERN PENINSULA; Nilghiri Mts.; CEYLON.—DISTRIB. Sumatra, China, Japan, Loochoo Islds.

Branchlets with rather soft bark, whorled or repeatedly forked. *Leaves* 2–3 by $\frac{3}{4}$–$1\frac{3}{4}$ in., rather crowded at the ends of the branches; petioles $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* $\frac{1}{2}$–$\frac{3}{4}$ in., 2-edged. *Flowers* $\frac{3}{4}$ in. diam., in the axils of the fallen leaves; corolla spreading, pale yellow. *Ovary-cells* 2-ovuled. *Fruit* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., baccate, almost juiceless, usually more than 2-seeded.—Griffith's *Ternstrœmiacea* from Khasia (*Itin.* 42, *Notul.* iv. 568; *Ic.* t. 604, f. 1), probably belongs to this, although described with unisexual flowers.

VAR. 1. *Wightii*, Choisy Mem. Ternst. 19 (sp.), leaves acute.—T. aneura, *Miq. Fl. Ned. Ind. Suppl.* i. 477. Cleyera gymnanthera, *W. & A. Prodr.* 87; *Wight. Ic.* t. 47; *Thw. Enum.* 41; *Bedd. Flor. Sylvat.* t. 91. C. grandiflora, *Wall. Cat.* 1461 (*in Herb. Linn. Soc. only*).

VAR. 2. *parvifolia*, Miq. Ann. Mus. Bot. iii. 14; leaves 1½–2 in.

2. **T. emarginata,** *Choisy Mem. Ternstr.* 14; a shrub 10–16 ft., leaves sessile spathulate crenulate-serrate emarginate, style deeply 2-fid, stigmas flatly capitate, fruit conical. Cleyera emarginata, *Gardn. in Calc. Journ. Nat. Hist.* vii. 447; *Thw. Enum.* 40.

CEYLON; higher parts of the Island, *Gardner*.

Leaves 1–2 in. *Peduncles* ¾ in., 2-edged, minutely bracteate. *Flowers* ½ in. diam., white, then yellowish-purple. *Petals* twice the length of the sepals. (*Ovary-cells* 1-ovuled, *Thw.*) *Fruit* oblong-ovoid, baccate, 2-seeded.—As Choisy points out, this so closely resembles the Brazilian *T. cuneifolia* as to be barely distinguishable.

* Diœcious, *anthers* not apiculate. Erythrochiton, *Griff.*

3. **T. penangiana,** *Choisy Mem. Ternstr.* 20; stigmas 2 reniform foliaceous, fruit ovoid baccate with a coriaceous epicarp. T. macrocarpa, *Scheff. obs. phyt.* 15, *fide Kurz, in As. Soc. Journ. Beng.* 1870, ii. 64. Erythrochiton Wallichianum, *Griff. Notul.* iv. 565, t. 585 A, f. 7. Fagræa? dubia, *Wall. Cat.* 4456.

EASTERN PENINSULA; from Moulmein and the Andaman Islands to Penang and Malacca.—DISTRIB. Java.

A small tree with a thick trunk. *Leaves* 4–8 by 1½–3½ in., oblanceolate to obovate, acute, coriaceous; petioles about 1 in. *Flowers* nearly 1 in. diam., solitary axillary or subfasciculate. *Petals* fleshy, twice the length of the sepals. *Stamens* many in the male flowers, crowded in many rows, reduced to filaments in the female flowers. *Ovary-cells* 2-ovuled; style very short. *Berry* 1½ in. diam. *Seeds* 4, bony, imbedded in a reddish or pinkish pulp.

VAR. *monosperma;* berry 1 in. diam., 1-seeded.

T.? KHASYANA, *Choisy Mem. Ternstr.* 20, Griff. n. 422 in Herb. Boissier from the Khasia Mts., proves from the examination of the type specimen to be identical with *Illicium Griffithii*, H. f. & T., p. 40. (See Journ. Linn. Soc. xiii. 331.)

3. SLADENIA, Kurz. MS.

A shrub? *Leaves* crenately serrate, glabrous, feather-veined. *Flowers* in dichotomous cymes shorter than the leaves. *Sepals* 5. *Petals* 5, free. *Stamens* about 12, slightly adnate to the base of the petals, filaments dilated at the base; anthers basifixed, the lobes slightly divergent below, hispid. *Ovary* 3-celled, tapering into the very short 3-denticulate style; ovules 2 in each cell, pendulous. *Fruit* unknown.

1. **S. celastrifolia,** *Kurz, ms.*

YUNAN, Mynesa, *J. Anderson.*

Leaves 4–5 by 1½–2 in., oblong-obovate, acuminate, acute at the base; petioles ⅓ in. *Pedicels* ¼ in. *Sepals* ⅙ in., lanceolate, obtuse or hooded at the apex, papery. *Petals* oblanceolate, obtuse, rather longer than the sepals. *Anthers* lanceolate with a minutely bifid connective.

4. ADINANDRA, Jack.

Small evergreen trees with the habit of *Ternstrœmia* or *Gordonia.* *Peduncles* axillary, solitary, recurved, 2-bracteate at the apex. *Flowers* often silky outside. *Sepals* 5. *Petals* 5, connate at the base. *Stamens* many, often 1–4-adelphous, usually hairy. *Ovary* 3–5-celled; style ultimately elongate, entire or shortly 3–5-fid; ovules many in each cell. *Fruit* globose. *Seeds* many, small, albumen fleshy.—Distrib. Confined (except the W. African *A. Mannii*) to the Malay Peninsula and Indian Archipelago; species 10.

1. **A. dumosa,** *Jack in Malay Misc.* ii. no. 7, 50; leaves elliptic-oblong serrulate above the middle glabrous ferruginous beneath, petioles ½ in., peduncles about 1 in., sepals orbicular-ovate glabrous; *Wall. Cat.* 3664 *bis* (*ex Chois. Mem. Ternstr.* 90) & 7071 (*in Herb. Kew.*). A. Jackiana *and* trichocoryna, *Korth. Verh. Nat. Gesch. Bot.* 106, 107. A. cyrtopoda, stylosa, *and* glabra, *Miq. Flor. Ned. Ind. Suppl.* i. 478, 479. Ternstrœmia? dumosa, *Wall. Cat.* 2245 (*ex Chois. l.c.*). Camellia? Scottiana, *Chois. l.c.* (*not of Wall. Herb.*)

Eastern Peninsula; Sincapore and Malacca, *Jack.* &c.—Distrib. Sumatra, Java, Borneo, China.

A small tree. *Leaves* 2½–4½ by 1½–2½ in., acute at both ends, coriaceous; petioles ⅓ in. *Peduncles* solitary or in pairs, extra-axillary. *Bracts* ⅓ the length of the sepals. *Petals* twice the length of the sepals, ovate-oblong, acute, white. *Stamens* silkily-hairy. *Ovary* glabrous; style subulate, persistent, ½ in. in fruit. *Berry* ½ in. diam., glabrous.

2. **A. acuminata,** *Korth. Verh. Nat. Gesch. Bot.* 109; leaves oblong-lanceolate more or less acuminate glabrous, petioles ¼ in., peduncles ½ in., sepals oblong-ovate glabrous. Gordonia acuminata, *Wall. Cat.* 3664 *in Herb. Linn. Soc.* Ternstrœmia? coriacea, *Wall. Cat.* 1453. Camellia axillaris, *Wall. Cat. p.* 158 (*not of Roxb. ex Bot. Reg.* 349, see *Journ. Linn. Soc.* xiii. 330). Polyspora axillaris, *Chois. Mem. Ternstr.* 91 (*not of Don*).

Eastern Peninsula; Penang and Sincapore, *Wallich*, &c.—Distrib. Sumatra.

A small tree. *Buds* silky. *Leaves* 3–6 by 1½–2½ in. *Peduncles* thickened and warted after flowering. *Bracts* minute, deltoid, acute. *Sepals* ½–⅓ in. *Stamens* hairy. *Style* pilose, filiform, thickened below; stigma very minutely 2-lobed, subcapitate. *Berry* ¾ in. diam., glabrous. *Seeds* about 6 in each cell, discoid, rather large.

3. **A. Griffithii,** *Dyer;* leaves oblong-elliptic to oblong-lanceolate acuminate glabrous, petioles ½ in., peduncles 1 in., sepals rotund-elliptical glabrous, styles deeply 5-fid. *Kew Distrib.* 755, Cleyera grandiflora.

Eastern Bengal; Khasia Mts., *Griffith.*

A tree? *Buds* glabrous. *Leaves* 3–5 by 1½–2 in., paler beneath. *Bracts* almost obsolete. *Sepals* ⅓ in. *Petals* about equalling the sepals. *Stamens* sparingly setose, 1-seriate, adnate to the petals. *Ovary* glabrous; divisions of the style cylindric, hardly exceeding the sepals.

4. **A. integerrima,** *T. Anders. ms.;* leaves ovate or oblong-ovate glandular-serrulate paler beneath with black glands and a few hairs, petiole ¼–⅓ in. pubescent, peduncles ½ in. strigose, sepals ovate silky outside. A dasyantha, *Choisy Mem. Ternstr.* 90 (*not of Korth.*). Ternstrœmia? integerrima, *Wall. Cat.* 1452 *in Herb. Linn. Soc.* T.? reticulata, *Wall. Cat.* 2246 (*ex Choisy l.c.* 90). Gordonia reticulata *Wall. Cat.* 3663 *bis in Herb. Kew &* 7070 (*ex Choisy l.c.*). Camellia japonica, *Wall. Cat.* 3667 *in Herb. Kew.*

Eastern Peninsula; Penang, *Wallich.*

Branches with pubescent extremities and silky buds. *Leaves* 3–5 by 1½–2½ in., acute at both ends or obtusely acuminate. *Bracts* small, ovate, acute. *Sepals* ⅓ in., exceeding the silky petals. *Stamens* adnate to the base of the petals; anthers silky. *Ovary* densely silky. *Berry* ⅔ in. diam., with appressed pubescence. *Seeds* small, shining.

5. **A. maculosa,** *T. Anders. ms.;* leaves finely mottled beneath with reddish-brown remotely denticulate glabrous, petioles ⅓ in., peduncles ½ in.

puberulous, sepals strigosely pubescent outside. Ternstrœmia? integerrima, *Wall. Cat.* 1452 *in Herb. Kew., not in Herb. Linn. Soc.*

Eastern Peninsula; Penang, *Wallich.*

Branches glabrous; buds yellow, silky. *Leaves* 4–6 by 2–2½ in., elliptic or elliptic-oblong, shortly acuminate, acute at the base. *Bracts* ⅓ the length of the sepals, orbicular. *Berry* ½ in. diam., hoary with thin appressed pubescence. *Seeds* minute.

6. **A. villosa,** *Choisy Mem. Ternstr.* 24; leaves pubescent beneath, petioles ¼ in., peduncles 1 in. pilose, sepals silky near the middle externally. Ternstrœmia? sericea, *Wall. Cat.* 1454. Schima Wallichii, *Choisy Mem. Ternstr.* 91 (*not of Choisy in Zoll. Cat.*).

Eastern Peninsula; Tavoy, *Wallich.*

A small pubescent tree; young shoots silky. *Leaves* 3½–5 by 1½–2 in., oblong ovate-oblong or elliptic, acute or acuminate, base obtuse, glabrous above, yellowish below, subcoriaceous. *Peduncles* nodding. *Bracts* obsolete. *Flowers* ¾ in. diam. *Sepals* ovate. *Petals* densely silky at the apex. *Style* elongate, subulate, strigose but glabrous at the apex. *Berry* ½ in. diam., covered with white appressed silky hairs.—Habit of *A. integerrima.*

7. **A. crenulata,** *T. Anders. ms.;* leaves narrow elliptic-oblong crenulate-serrate glabrous, petioles ⅙ in., peduncles 1–1¼ in. thinly strigose. Ternstrœmia crenulata, *Wall. Cat.* 3723.

Eastern Peninsula? *Herb. Madr.* (*Wallich.*)

Glabrous except the flowers and buds. *Leaves* 3–5 by 1¼–1½ in., acute at both ends, prominently reticulated above. *Peduncles* thickened at the apex, slightly recurved. *Bracts* nearly obsolete. *Sepals* and *petals* as in *A. villoso*, but less silky. *Stamens* adnate to the petals, filaments short, glabrous; anthers silky, with an acuminate connective.—The plant described under the name of *Ternstrœmia crenulata* by Wight, (Ill. i. 99) is a species of *A. porosa.*

8. **A. lasiopetala,** *Chois. Mem. Ternstr.* 24; leaves narrow oblanceolate glabrous above minutely strigillose beneath, margins revolute denticulate, flowers silky-strigose externally. Sarosanthera lasiopetala, *Thw. Enum.* 41. Cleyera lasiopetala, *Wight Ill.* i. 99. Eurya lasiopetala, *Gardn. in Calc. Journ. Nat. Hist.* vii. 466.

Ceylon; at 6000 ft. and upwards.

A small tree; branches terete, minutely strigose. *Leaves* 2½–4 by ¾–1 in., obtuse or subacuminate, retuse. *Peduncles* ⅔ in., nodding, thickened towards the apex. *Bracts* ⅓ the length of the sepals, deltoid. *Flowers* ½–⅔ in. diam. *Petals* 3 times the length of the sepals, white. *Stamens* thinly hairy, unequal, filaments slender. *Ovary* 3-celled; style filiform, stigmas 3 cylindric obtuse. *Berry* ½ in. diam.

5. CLEYERA, DC.

Trees or shrubs with the habit of *Ternstrœmia.* *Peduncles* shorter, often fascicled, flowers smaller; bracts minute or 0. *Sepals* 5. *Petals* 5, more or less connate at the base. *Stamens* many; anthers pilose. *Ovary* 2–3-celled; style often elongate with a shortly 2–3-fid apex, or shorter and more deeply divided, stigmas slender; ovules many. *Seeds* usually few, albumen fleshy.—Distrib. Tropical Asia; Japan, Mexico and the Antilles. Species about 6.

1. **C. ochnacea,** *DC. Mém. Ternstr.* 21; leaves oblong-obovate or oblong-oblanceolate acuminate, base acute, flowers usually in small fascicles rarely solitary, apex of peduncles with 2 almost obsolete bracts. C.

Wallichiana, *Sieb. & Zucc. Fl. Jap.* i. 154. C. ochnoides, *G. Don Gen. Syst.* i. 566.

Central Himalaya; Nipal, *Wallich.* Khasia Mts., alt. 2000 ft.

Leaves 3–4½ in. by 1¼–2 in.; petioles ½ in. *Peduncles* ⅝ in., usually nodding, thickened towards the apex. *Petals* ⅓–½ in., 3 times the length of the sepals, yellow. *Style* subulate, persistent. *Fruit* baccate.—Probably *C. japonica*, Sieb. and Zucc., which has the pedicels and flowers only ½ as large is not distinct.

Var. 1. *Lushia*, G. Don Gen. Syst. i. 566 (sp.); fascicles about 5-flowered, peduncles erect. Ternstrœmia Lushia, *Ham. in Don Prodr.* 225.

Var. 2. *grandiflora*, Chois. Mem. Ternstr. 21 (sp.); fascicles 2–4-flowered, flowers larger, leaves narrower more acuminate. C. grandiflora, *Wall. Cat.* 1461 *in Herb. Kew., not in Herb. Linn. Soc.*

2. **C. grandiflora,** *H. f. & T. ms.* (*not of Wall. or Choisy*); leaves oblong obtusely acuminate base obtuse, flowers usually solitary, peduncles with 2 minute alternating bracts.

Eastern Bengal; Khasia Mts., alt. 4000 ft., *J. D. H. & T. T.*

Leaves 4–5½ by 1½–2 in.: petioles ¾ in. *Peduncles* about ¾ in., usually erect. *Flowers* ¾ in. diam. *Petals* ½ in., about four times the length of the sepals.—Closely allied to *C. ochnacea*, but larger in all its parts.

6. EURYA, Thunb.

Shrubs. *Leaves* glabrous, usually crenate-serrate. *Flowers* small, diœcious, sessile or shortly pedicelled in axillary fascicles, or rarely solitary, with persistent bracteoles. *Sepals* 5. *Petals* 5, united at the base. *Stamens* 15 or less, rarely 5; anthers glabrous. *Ovary* 3 (rarely 2–5-)-celled; styles 3 (rarely 2–5) free or united; ovules many in the inner angle of each cell. *Fruit* baccate. *Albumen* fleshy.—Distrib. S. E. Asia, Indian Arch. and Pacific Is.; reputed species more than 30, reducible at most to 10. Thwaites indeed, after careful study, unites 1, 3, 4, 5 into one variable species.

1. **E. japonica,** *Thunb. Fl. Jap.* 191, t. 25; glabrous, branches striate, flowers about 2 together 2-bracteolate, sepals glabrous.

Eastern Himalaya; Sikkim, alt. 5–10,000 ft.; Khasia Mts., alt. 3–6000 ft.; Mountains of the Eastern and Western Peninsulas, and Ceylon ascending to 7000 ft.—Distrib. Eastwards to Japan and the Fiji Islands.

Var. 1. *Thunbergii*, Thw. Enum. 41; leaves 3–5 by 1–1½ in. elliptic or oblanceolate more or less serrate acuminate, petioles ¼ in., styles free. E. tristyla, *W. & A. Prodr.* 86. E. Wightiana, *Wight Ill.* i. t. 38 (*not Wall.*). E. coneocarpa, *Korth. Verh. Nat. Gesch. Bot.* 114. E. elliptica, *Gard. in Calc. Journ. Nat. Hist.* vii. 443. E. japonica, *Beddome Flor. Sylvat.* t. 92.—Sikkim, 5–10,000 ft. *J. D. H.*; Concan, *Stocks;* Ceylon, *Gardn.*, Nilghiris, *Gardn.*—Distrib. S. China, Loochoo I., Japan, Fiji I.—*E. vitiensis*, A. Gray.

Var. 2. *nitida*, Korths. l.c. 115, t. 7 (sp.); stems 8 ft., leaves 1½–2½ by ½–1 in. narrow elliptic or oblanceolate serrate above acute or shortly acuminate, petioles ⅛ in., styles united beyond the middle. E. Roxburghii, *Wall. Cat.* 1465, *in part.* E. systyla, *Miq. in Herb. Honenacker.* E. Wightiana, *Wall. Cat.* 3662. E. fasciculata, *Wall. Cat.* 4399.—Habit resembling that of the Tea shrub.—Khasia, 3–6000 ft. *Griffith;* Moulmein, 5000 ft.; Penang, *Lobb.*—Nilghiris, *Gardn.* Distrib. Borneo, Sumatra, Java.

Var. 3. *phyllanthoides;* Blume Mus. Bot. ii. 110 (sp.); tips of branches silky-pubescent, leaves 4–5 by 1 in. usually narrow elliptic serrulate with a long acuminate apex, petioles ¼ in., styles united.—Khasia Mts., Moulmein.—Distrib. Java.

2. **E. symplocina,** *Blume Mus. Bot.* ii. 114; branches striate silky at the apex, flowers in rather crowded fascicles, peduncles 3-bracteolate silky

sepals silky outside, styles united. E. acuminata, *Wall. Cat.* 1464 *in part, not of DC.* E. Wallichiana, *Planch. ms., not of Steud.* Diospyros cerasifolia, *Don Prodr.* 144.

Central and Eastern Himalaya, alt. 5–7000 ft.; from Nipal, *Wallich*, to Mishmi, *Griffith.*—Distrib. Java.

A slender shrub. *Leaves* 3–5 by 1–$1\frac{1}{2}$ in., oblong-elliptic, entire or serrulate above, obtusely acuminate, papery, midrib with appressed pubescence; petioles $\frac{1}{4}$ in.

3. **E. chinensis,** *R. Br. in Abel's Voy.* 379, *cum ic.*; branches subflexuose 2-edged pilose, leaves small, flowers 2–3 together subsessile 2-bracteolate, sepals glabrous, styles united. E. parvifolia, *Gardn. in Calc. Journ. Nat. Hist.* vii. 445. E. japonica δ parvifolia, *Thw. Enum.* 41.

Ceylon; ascending to 8000 ft.—Distrib. China, Japan.

A shrub 3–12 ft. *Leaves* $\frac{3}{4}$–$1\frac{1}{4}$ by $\frac{1}{2}$–$\frac{2}{3}$ in., obovate, margins revolute, mucronate serrate, obtusely acuminate, midrib hairy, petioles $\frac{1}{12}$ in. *Pedicels* and *bracteoles* glabrous.

4. **E. ceylanica,** *Wight Ill.* i. 98; branches cylindric pilose, leaves with depressed veins, flowers 2–4 together 2-bracteolate shortly peduncled, sepals glabrous, stigmas 3 subsessile reflexed. E. japonica γ chinensis, *Thw. Enum.* 41.

Ceylon, alt. 3–7000 ft.

A shrub, 12–16 ft. *Leaves* $1\frac{1}{2}$–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., broadly, elliptic, shortly acuminate, *margins* recurved, mucronate-serrate, tip retuse, midrib hairy; petioles $\frac{1}{12}$ in. *Pedicels* and *bracteoles* hairy. *Fruits* with a few scattered hairs.

5. **E. acuminata,** *DC. Mém. Ternstr.* 29; branches cylindric pubescent-hairy, flowers about 5 together shortly peduncled 2-bracteolate, styles 3–5 distinct or united below. Diospyros serrata, *Ham. in Don Prodr. Nep.* 143.

Temperate and Subtropical Himalaya, alt. 3–7000 ft., from Kumaon to Bhotan; Mountains of Eastern Bengal, Assam, and the Eastern Peninsula to Penang; Ceylon.—Distrib. Sumatra, Java, Fiji Islands.

A shrub 8–10 ft. *Leaves* 2–5 by $\frac{1}{2}$–1 in., narrow oblong-elliptic, serrulate, attenuate-acuminate, midrib softly hairy

Var. 1. *euprista*, Korths. Verh. Nat. Gesch. Bot. 113 (sp.); styles distinct. *Griff. Ic.* 604, *f.* 3. E. multiflora, *DC. l.c.* 25. E. serrata, *Blume Fl. Jav. præf.* vii E. augustifolia, *Wall. Cat.* 1465 *in Herb. Linn. Soc.* E. acuminata, *Royle Ill.* 127, t. 25. E. salicifolia, *Blume Mus. Bot.* ii. 118. ? E. chinensis, *Hook. f. & Thoms. Herb. Ind. Or.* (*not of Brown*).

Var. 2. *Wallichiana*, Steud. in Blume Mus. Bot. ii. 118 (sp.); styles united. E. lucida, *Wall. Cat.* 1462. E. fasciculata, *Ham. in Wall. Herb.* 1463. E. acuminata, *Wall. Cat.* 1464. E. bifaria, *Wall. Cat.* 3721? E. membranacea, *Gardn. in Calc. Journ. Nat. Hist.* vii. 444. E. japonica β acuminata, *Thw. Enum.* 41.

6. **E. trichocarpa,** *Korth. Verh. Nat. Gesch. Bot.* 114; branches cylindric pubescent at the apex, flowers few together, peduncles 2-bracteolate, ovary densely silky, styles 3–5 united $\frac{2}{3}$ of their length. E. trichogyna, *Blume Mus. Bot.* ii. 114.

Eastern Himalaya, Bhotan, *Griffith*; Khasia Mts., *Griffith.*—Distrib. Amboyna.

Buds silky. *Leaves* 3–$4\frac{1}{2}$ by $\frac{3}{4}$–1 in. narrowly elliptic, acuminate, serrulate, pubescent especially on the midrib below; petioles $\frac{1}{8}$ in. *Sepals* pubescent externally.

7. **ACTINIDIA,** Lindl.

Glabrous, strigose or tomentose shrubs, usually climbers. *Leaves* entire or serrate, usually membranous, feather-veined. *Flowers* polygamous or diœcious, in axillary cymes, rarely solitary. *Sepals* 5, slightly imbricate, subconnate at the base. *Petals* 5, somewhat contorted-imbricate. *Stamens* many; anthers dehiscing by slits. *Ovary* many-celled; styles as numerous, divergent and elongated after flowering. *Fruit* baccate, containing raphides.—DISTRIB. Himalaya, China and Japan; species about 8.

1. **A. callosa,** *Lindl. Nat. Syst. ed.* 2, 439; glabrous, leaves broadly elliptic setosely serrulate, sepals tomentose, fruit sparsely warted. A. Kolomitka, *Rupr. in Maxim. Amur.* 63. Dillen. ord. callosa, *Wall. Cat.* 6634.

TEMPERATE HIMALAYA, from Garwhal to Bhotan, alt. 4–8000 ft.; KHASIA MTS., alt. 4–5000 ft.—DISTRIB. Manchuria, Japan, Loochoo Islands.

A shrubby climber; stems brown with white verruculæ. *Leaves* 4–6 by 2–3½ in., membranous, acuminate; petioles 1–1½ in. *Flowers* ½ in. diam. in small lax umbellate cymes, white. *Pedicels* with an obsolete bract below the calyx. *Sepals* oblong, obtuse. *Styles* clavate. *Fruit* ¾ in., ovoid.

2. **A. strigosa,** *Hook. f. & Thoms. in Journ. Linn. Soc.* v. 55; strigose-hispid, leaves ovate or oblong callously ciliate or denticulate, sepals nearly smooth.

SIKKIM HIMALAYA, alt. 6–8000 ft., *J. D. H.*

A shrubby climber with the habit of *A. callosa*. *Leaves* 4–5 by 2–3 in., acuminate; petioles about 1 in. *Peduncles* short, 2–4-flowered. *Flowers* ¾ in. diam., shortly pedicelled, white. *Sepals* elliptic, obtuse. *Styles* scarcely dilated at the apex. *Fruit* 1¼ in., ovoid, mucilaginous, edible.

8. SAURAUJA, Willd.

Trees or shrubs. *Branches* usually brown with whitish tubercular dots, at first as well as the leaves more or less strigose-pilose or scaly. *Leaves* approximate at the ends of the branches, usually serrate, with parallel veins diverging from the midrib. *Inflorescence* lateral, often from the axils of fallen leaves, cymose, subpaniculate, rarely few-flowered. *Bracts* usually small, remote from the calyx. *Flowers* usually hermaphrodite. *Sepals* 5, strongly imbricate. *Petals* 5, usually connate at the base. *Stamens* many; anthers dehiscing by pores. *Ovary* 3–5-celled; styles as many, distinct or connate; ovules many. *Fruit* baccate, rarely dry and subdehiscent.—DISTRIB. Tropical and subtropical Asia and America. Species about 60.

* *Flowers* in axillary peduncled panicles. *Styles* 5.

1. **S. napaulensis,** *DC. Mém. Ternstr.* 29; panicles 2–4 in. alternately branched with a peduncle about 5 in., bracteoles deciduous elliptic acute, sepals orbicular glabrous. *Wall. Pl. Asiat. Rar.* ii. 40, 77, t. 178; *Cat.* 1469. S. paniculata, *Wall. in G. Don Gen. Syst.* i. 567. Ternstrœmia racemosa, *Don Prodr.* 225. Zanthoxylum Serra, *Turcz. in Bull. Mosc.* 1858, 440.

TEMPERATE HIMALAYA, from Bhotan and Sikkim, alt. 5–7000 ft., to Garwhal, alt. 2400–5000 ft.; KHASIA MTS., alt. 5000 ft.; MISHMI HILLS, *Griffith.*

A moderate sized tree; youngest branches, petioles, midribs and peduncles covered with scurfy tomentum, mixed with brown, deciduous, acuminate scales. *Leaves* 10–15 by 3–4 in., narrow oblong-elliptic, rounded at the base, shortly acuminate, strongly serrate, nearly glabrous above, thinly ferruginous-tomentose beneath; petioles 1–1½ in. *Flowers* ½ in. diam., pink. *Sepals* ⅙ in. *Petals* at length recurved at the apex. *Fruit* green, mealy inside, edible, sweet. *Seeds* red-brown.—Varies with elliptic obtuse leaves.

2. **S. Griffithii,** *Dyer;* panicle 4–6 in. alternately branched with a peduncle 6–8 in., bracteoles small oblong, sepals elliptic obtuse densely tomentose externally.

ASSAM, *Griffith.*

Covered except on the smooth upper surface of the leaves and old wood with dense brown flocculent tomentum without scales. *Leaves* 8–10 by 4–5 in., broadly elliptic, oblong, rounded at both ends, abruptly and very shortly acuminate, margin with remote spinulose serratures; petioles about 2 in. *Sepals* $\frac{1}{6}$ in.

** *Flowers* in fascicles (the peduncle evanescent) of about 4 trichotomous cymes from the axils of fallen leaves. *Styles* 5.

3. **S. fasciculata,** *Wall. Pl. As. Rar.* ii. 40, t. 148, *Cat.* 1468; cymes 1–3-flowered glabrous, bracteoles minute linear-deltoid.

EASTERN SUBTROPICAL HIMALAYA; Nipal, *Wallich;* Sikkim, alt. 2–4000 ft., *Griffith,* &c.

A bush or small tree 20 ft. high, tomentose as in *S. napaulensis*, but the scales truncate and torn. *Leaves* 7–10 by 2–3 in., narrow elliptic-olong, acute or rounded at the base, attenuate-acuminate, obtusely serrate, glabrous above, ferruginous-tomentose beneath; petioles 1–2 in. *Cymes* 2–3 in., branches red; bracteoles $\frac{1}{12}$ in. *Flowers* $\frac{1}{3}$ in. diam., pedicelled, subcampanulate, white then pink. *Sepals* $\frac{1}{6}$ in., ovate, obtuse.

4. **S. punduana,** *Wall. Pl. As. Rar.* ii. 40, *Cat.* 1470; cymes many-flowered scaly, bracteoles broadly ovate, flowers $\frac{3}{4}$ in. diam. S. fasciculata *var.* abbreviata, *Choisy Mem. Ternstr.* 27.

SIKKIM HIMAYALA; alt. 3–5000 ft.; KHASIA MTS., alt. 2–4000 ft.; MISHMI HILLS and BIRMA, *Griffith.*

Habit of *S. fasciculata*, but the scales mostly acute. *Leaves* 8–11 by 3–4 in., acuminate; petioles 1–2 in. *Cymes* 3 in., rarely solitary; bracteoles $\frac{1}{12}$–$\frac{1}{4}$ in. *Flowers* $\frac{3}{4}$ in. diam., pink. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., broadly ovate, rounded.—Varies with elliptic obtuse leaves.

5. **S. Roxburghii,** *Wall. Pl. As. Rar.* ii. 40, *Cat.* 1467; cymes many-flowered thinly tomentose, bracteoles deltoid acute, flowers $\frac{1}{4}$ in. diam. Ternstrœmia serrata, *Roxb. Hort. Beng.* 40, *not of Jack.*

SILHET and KHASIA MTS., ascending to 4000 ft.; CHITTAGONG, *J. D. H. & T. T.;* PEGU, *Kurz.*

A shrub or small tree, tomentose as in *S. napaulensis*, the scales minute acute. *Leaves* 6–14 by 2–5 in., elliptic or elliptic-oblong, acute at both ends or shortly acuminate, obtusely serrate, smooth above, ferruginous-tomentose below; petioles 1–2 in. *Cymes* 1–3 in.; bracteoles $\frac{1}{25}$ in. *Flowers* subcampanulate. *Petals* white, then pink. *Stamens* about 50. *Styles* 5. *Berries* the size of a small pea.

*** *Flowers* (except on the old wood) in fascicles of many simple or very shortly peduncled pedicels. *Styles* 3 or 5.

6. **S. tristyla,** *DC. Mém. Ternstr.* 31, t. 7; leaves obovate or broadly oblong. *Wall. Cat.* 1466. S. leucophloia *and* S. media, *Korth. Verh. Nat. Gesch. Bot.* 125. Scapha Candollii *and* S. pinangiana, *Choisy Mem. Ternstr.* 31. Ternstrœmia pentapetala, *Jack in Malay Misc.* i. no. 5, 40. T. trilocularis, *Roxb. ex Wall. Pl. As. Rar.* ii. 40. T. bilocularis, *Roxb. Fl. Ind.* ii. 522. Cleyera pentapetala, *Spreng. Syst. Veg.* ii. 596.

EASTERN PENINSULA; from Tenasserim, *Helfer*, to Penang, Sincapore, and Malacca, *Wallich, Maingay.*—DISTRIB. Moluccas, S. China.

A shrub or small tree; branches with grey unspotted bark. *Leaves* 7–10 by $2\frac{1}{2}$–$4\frac{1}{2}$ in. acuminate, spinulose-serrate, glabrous on both sides except the scale-like hairs on the nerves and the midrib beneath; petioles $\frac{1}{2}$–$1\frac{1}{2}$ in. *Flowers* on old wood in fascicles of about twice 3-chotomous cymes. *Pedicels* $\frac{3}{4}$ in., scaly and hairy. *Flowers* $\frac{1}{2}$ in. diam. *Sepals* obovate, obtuse. *Petals* white. *Stamens* about 20. *Styles* 3, rarely 5, distinct. *Berries* usually 3-lobed.

7. **S. macrotricha,** *Kurz, ms.*; leaves very narrowly lanceolate.

Birma at Durunja, alt. 1000 ft., *Griffith*; Yunan at Ponsee, *J. Anderson.*

A small tree, clothed except on the old wood with stiff setose hairs. *Leaves* 9–11 by 1–2½ in., attenuate above and below, setosely serrate, more sparingly hairy on both surfaces; petioles ¾ in. *Pedicels* 1 in. or less, unequal. *Flowers* red. *Sepals* ⅙ in., elliptic, obtuse. *Styles* 5, connate below.

**** *Flowers* from the axils of fallen leaves, sessile solitary or aggregate, *Styles* 4.

8. **S. cerea,** *Griff. ms.;* ovary densely hairy. *Griff. Itin. Notes,* 200.

Bhotan Himalaya, at Murichom, alt. 3500 ft., *Griffith.*

A small tree. *Leaves* 7–10 by 4–5 in., cuneate-obovate, acute, setosely serrate, glabrous on both sides, veins below with distant setose scales; petioles ½ in., scaly. *Flowers* 1 in. diam. *Sepals* orbicular, densely scaly externally. *Petals* orbicular-obovate, white with the base blood-red, waxy.

DOUBTFUL SPECIES.

S. sterculifolia, *Griff. Itin. notes,* 198, Bhotan.—Probably *S. napaulensis.*
S. ferruginea, *Griff. Itin. notes,* 120, Bhotan.
S. micrantha, *Griff. Itin. notes,* 71, Khasia.—Probably *S. Roxburghii.*

9. **STACHYURUS,** Sieb. & Zucc.

Glabrous shrubs or small trees. *Leaves* serrate, membranous. *Flowers* small, in short lateral spikes or racemes. *Bracts* 2, connate at the base. *Sepals* 4, strongly imbricate. *Petals* 4, free. *Stamens* 8; anthers dehiscing by slits. *Ovary* 4-celled; style simple, stigma capitate-peltate; ovules many. *Berry* 4-celled. *Cotyledons* elliptic, radicle short.—Distrib. 2 known species, a Japanese and a Himalayan.

1. **S. himalaicus,** *Hook. f. & Thoms; Benth. in Journ. Linn. Soc.* v. 55; leaves shortly petioled attenuate-acuminate, berries subsessile subglobose. Indeterm. *Wall. Cat.* 7417.

Eastern Temperate Himalaya; Nipal, *Wallich;* Sikkim, alt. 5–8000 ft., *J. D. H.;* Bhotan, *Griffith.*

A small-tree with straggling branches. *Leaves* 4–6 by 1½–2 in., ovate, with a rounded base, finely serrate, the veins strongly reticulated beneath; petioles ½–¾ in. *Spikes* 2–3 in., erect. *Berries* the size of a small pea.

10. **SCHIMA,** Reinw.

Trees with papery evergreen leaves. *Peduncles* usually erect, axillary or solitary, or the uppermost shortly racemed. *Flowers* handsome, 2-bracteolate. *Sepals* 5, subequal. *Petals* 5, much larger, connate at the base, the outermost concave and sub-cucullate. *Stamens* many, adnate to the base of the petals. *Ovary* 5- (rarely 4–6-) celled; styles.simple or slightly lobed at the apex with broad spreading stigmas; ovules 2–6 in each cell, attached laterally, sub-pendulous. *Capsule* woody, depressed-globose, loculicidal, with a persistent axis. *Seeds* flat, kidney-shaped, dorsally winged, hilum central, albumen scanty; cotyledons foliaceous, flat or crumpled, accumbent; radicle inferior, curved upwards.—Distrib. Tropical Asia. Species about 7.

1. **S. mollis,** *Dyer;* leaves quite entire with nearly simple lateral veins, peduncles 1 in. with minute white warts, fruit pubescent when young. Gordonia mollis, *Wall. Cat.* 1458.

TAVOY, *Wallich.*

Branches brown with minute scattered white warts. *Leaves* 5–7 by 1–2 in., elliptic, tapering and acute at both ends, smooth on both surfaces with red veins; petiole ¾ in., pubescent. *Peduncles* thickened upwards. *Sepals* 1/12 in. long, with pubescent-ciliate margins, glabrous externally.

2. **S. Wallichii,** *Choisy in Zoll. Cat.* 144; leaves entire or obscurely crenate-serrate with forked lateral veins, flowers in a short terminal raceme, peduncles ¾–2 in. with minute white warts, fruit ¾ in. diam. pubescent when young, afterwards minutely warted. S. hypoglauca, *Miq. Fl. Ned. Ind. Suppl.* i. 484. Gordonia Wallichii, *DC. Prodr.* i. 528; *Wall. Cat.* 1455. G. integrifolia, *Roxb. Hort. Beng.* 52. G. Chilaunia, *Ham. in Don Prodr.* 225. G. sp. *Griff. Notul.* iv. 562, t. 600.

EASTERN HIMALAYA, from Nipal, *Wallich*, and Sikkim, alt. 2–5000 ft., *J. D. H.*, to Bhotan, *Griffith.* ASSAM, CHITTAGONG, and the KHASIA MTS., alt. 2–4000 ft., *Wallich*, &c. BIRMA, *Griffith.*—DISTRIB. Sumatra.

A tree 80–100 ft., with rough or smooth, pale or brown bark. *Leaves* 6–7 by 2–3 in., elliptic-oblong, tapering or rounded below, acute or slightly acuminate, glabrous and reddish-veined above, reticulate and more or less pubescent beneath; petiole ½ in., pubescent. *Peduncles* rather slender; bracts ¼ in., alternate, narrow oblong, retuse. *Flowers* 1½–2 in. diam., white, fragrant. *Sepals* ⅙ in. long, with pubescent-ciliate margins, glabrous, or slightly pubescent outside. *Petals* pubescent outside at the base.

3. **S. crenata,** *Korth. Verh. Nat. Gesch. Bot.* 143, t. 29; leaves faintly crenate-serrate, flowers in a loose terminal corymb, peduncles 1½–2 in. smooth slender, fruit ½ in. diam. pubescent. Gordonia floribunda, *Wall. Cat.* 1456; *Griff. Notul.* iv. 563. G. oblata, *Roxb. Fl. Ind.* ii. 572. G. sp. *Griff. l.c.* 562.

EASTERN PENINSULA, from Tenasserim to Penang. BIRMA, *Griffith.*—DISTRIB. Borneo, Sumatra.

A tree 30–60 ft. *Branchlets* compressed, pubescent. *Leaves* about 6 by 2 in., elliptic, acute at the base, acuminate, glabrous on both surfaces, rather leaden-coloured above; petiole ½ in., glabrous. *Flowers* 1¼ in. diam., white, fragrant. *Sepals* hardly ⅙ in., long, margins scarcely ciliate, glabrous externally. *Petals* pubescent externally at the base. *Stigma* 4–5-lobed, peltate.—The Borneo and Sumatra specimens have ciliate sepals, pubescent externally. I agree, however, with Kurz (Journ. As. Soc. Beng. 1870, ii. 64), that they must be united with the Indian forms. *S. Noronhæ* has fewer and larger flowers and stouter peduncles.

4. **S. khasiana,** *Dyer;* leaves strongly serrate with nearly simple lateral veins, flowers from the axils of fallen leaves, peduncles ¾ in. stout with minute white warts, fruit ¾ in. diam. rough. Gordonia superba, *Hook. f. & Thoms. ms.* (*not of Gard. & Champ.*)

KHASIA MTS., alt. 4–6000 ft., *Griffith*, &c.

A tree with white bark. *Leaves* 5–6 by 2–2½ in., ovate, acute, glabrous on both surfaces, reticulate beneath; petiole ½ in., glabrous. *Flowers* 2½ in. diam. *Sepals* ⅙ in. long, with pubescent-ciliate margins, pubescent externally. *Petals* silky-pubescent externally on the lower half.

11. **PYRENARIA,** Blume.

Shrubs or trees. *Leaves* serrate, large and submembranous. *Flowers* subsessile, axillary, erect or nodding. *Sepals* usually 5, unequal, graduating from the bracts to the petals. *Petals* connate at the base. *Stamens* very numerous, mostly connate, adnate to the base of the petals. *Ovary* 5-celled; styles 5, free, or partially united; ovules 2 in each cell, attached laterally. *Fruit* drupaceous, indehiscent. *Seeds* oblong, stout, wingless with a thick woody testa; albumen 0; cotyledons large, crumpled or conduplicate; radicle inferior, inflexed.—DISTRIB. Malay Penins. & Ind. Arch. Species about 7.

* Leaves pubescent beneath.

1. **P. acuminata,** *Planch. ex Choisy Mém. Ternstr.* 84; bracts and sepals ovate acute. Ternstrœmia? macrophylla, *Wall. Cat.* 3663 *in Herb. Linn. Soc.* Gordonia (Camellia?) acuminata, *Wall. Cat.* 3664 *in Herb. Kew.*

EASTERN PENINSULA, Malacca and Sincapore, *Wallich*, &c.

Branches densely hairy. *Leaves* 8–12 by 2½–4 in., oblanceolate, obscurely serrulate, shortly acuminate, glabrous above; petiole ⅓–½ in., pubescent. *Flowers* 1¼ in. diam., shortly stalked. *Bracts* and *sepals* velvety externally. *Petals* round, silky externally, purplish-brown within. *Ovary* silky. *Fruit* 1½ by 1 in. when dry, pomaceous, wrinkled, finally nearly glabrous.

** Leaves glabrous beneath.

2. **P. camelliæflora,** *Kurz in Journ. As. Soc. Beng.* 1871, ii. 46; leaves oblong or elliptic-oblong subacuminate crenato-serrulate.

PEGU, *Kurz;* MARTABAN, *Brandis.*

A small tree, 25–30 ft. high. *Leaves* 5–7 by 1½–2 in., yellowish-green even when dried; petiole ⅓ in. *Flowers* ¾ in. diam., white; bracteoles small and as well as the sepals and petals silky externally. *Ovary* silky. *Drupe* about 1 in. long, obovoid, succulent, at first slightly pubescent, then pruinose. *Seeds* 2.

3. **P. attenuata,** *Seem. in Linn. Trans.* xxii. 340; leaves obovate serrulate, flowers ¾ in. diam. Freziera? attenuata, *Wall. Cat.* 1451. Thea viridis *var.* assamica, *Choisy Mém. Ternstr.* 91. Thea assamica, aff. sp., *Choisy l.c.* 68.

TAVOY, *Gomez.*

Branches glabrous; buds silky. *Leaves* 6–7 by 2½–3 in., obtuse or very shortly acuminate; petiole ½ in. *Flowers* very shortly peduncled. *Bracts, sepals,* and *petals* orbicular, pubescent externally. *Ovary* pubescent; styles united below, glabrous above.

4. **P. barringtoniæfolia,** *Seem. in Bonpl.* vii. 49; leaves spathulate strongly serrate, flowers 1½ in. diam. Eusynaxis barringtoniæfolia, *Griff. Notul.* iv. 560, t. 603, f. 1, 2, 3.

ASSAM, *Griffith;* Garrow hills in EASTERN BENGAL, *Lobb.*

A shrub 6 ft., with glabrous branches and pubescent buds. *Leaves* 8–10 by 2½–3½ in., tip rounded or truncate, cuspidate-acuminate; petiole ⅓ in. *Flowers* yellowish-white, very shortly peduncled. *Bracts, sepals,* and *petals* orbicular, erose-crenate, pubescent externally. *Ovary* silky, grooved; styles distinct. *Fruit* ovoid, 1¼ in. long when dry, longitudinally wrinkled, glabrous.

12. **GORDONIA,** Ellis.

Trees with evergreen entire or crenate leaves. *Flowers* usually handsome, often subsessile, solitary in the axils of the leaves or collected at the ends of the branches, 2–4-bracteolate. *Sepals* usually 5, unequal, graduating from the bracts to the petals. *Petals* free or often slightly connate at the base, the innermost larger. *Stamens* 5-adelphous or all connate, adnate to the petals. *Ovary* 3–5- (rarely 6-) celled; style single with a stout spreading stigma; ovules 4–8 in each cell. *Capsule* oblong, woody, loculicidal with a persistent axis. *Seeds* flat or compressed, prolonged upwards into an oblong wing (rarely obsolete) albumen 0; embryo mostly straight, oblique, with ovate flat or slightly crumpled cotyledons; radicle superior.—DISTRIB. N. America, Tropical Asia, Malay Archipelago. Species about 10.

1. **G. excelsa,** *Blume, Bijd.* iii. 130; leaves very shortly petioled narrowly elliptic or oblanceolate more or less acuminate obscurely serrulate usually coriaceous. G. singaporiana, *Wall. Cat.* 1457 (*in part*). Antheischima excelsa, *Korth. Verh. Nat. Gesch. Bot.* 138, t. 27. Dipterospermæ sp. *Griff. Notul.* iv. 564.

Bhotan Himalaya, (var. 1), *Griffith;* Eastern Peninsula, Sincapore, *G. Thomson;* Malacca, *Maingay.*—Distrib. Java, Amboyna.

Bark of young branches cracking transversely and scaling off. *Leaves* 4–10 by 1½–3 in., tapering at both ends; midrib strong; veins faint; petiole ¼ in. *Peduncles* ¼–½ in., short, pubescent. *Flowers* 1½–2 in. diam., pinkish, fragrant. *Sepals* and *petals* rather fleshy, orbicular, silky-pubescent externally with membranous edges. *Capsule* 1 in. long. *Valves* flat on the back, more or less tapering upwards.

Var. 1. *pubescens;* buds and young shoots pubescent.

Var. 2. *sincapuriana;* buds and young shoots glabrous.

2. **G. obtusa,** *Wall. Cat.* 1459; leaves shortly petioled narrowly elliptic tapering at both ends, obtuse or obtusely acuminate crenate papery. G. obtusifolia and G. parvifolia, *Wight Ill.* i. 99. Saurauja crenulata, *Wight in Wall. Cat.* 1459 (*not of DC.*).

Mountains of the Western Peninsula, from the Concan to the Pulney hills. Ceylon?

A tall tree; young branches with grey striate persistent bark, at first compressed; buds silky. *Leaves* 2–4 by 1–1½ in.; midrib strong; petioles ⅓ in. *Peduncles* short, pubescent. *Flowers* 1½ in. diam., white. *Sepals* orbicular, silky-pubescent externally; the membranous *petals* faintly so. *Capsule* 1 in. long, 5-angled, the valves deeply sulcate above.

3. **G. Maingayi,** *Dyer;* leaves petioled oblanceolate tapering below obtusely acuminate with obscurely serrulate and slightly revolute edges subcoriaceous, margins of petals and sepals glabrous.

Malacca, *Maingay.*

Branchlets numerous, slender, with grey and persistent bark; buds silky. *Leaves* 3 by 1–1¾ in.; petioles ½ in. *Flowers* 1 in. diam., subsessile. *Sepals* and *petals* orbicular, retuse, silky-pubescent externally, with membranous edges. *Capsule* 1 in. long, stained inside with purple; valves nearly flat on the back.—Closely allied to *G. obtusa*, but the subsessile flower-buds and flowers are smaller and the leaves stouter.

4. **G. zeylanica,** *Wight Ill.* i. 99; leaves shortly petioled elliptic-oblanceolate tapering at both ends with a minute retuse glandular point entire rather coriaceous.

Ceylon; forests of the Central Province, alt. 4–7000 ft., *Walker*, &c.

Bark of young branches persistent, smooth. *Leaves* 3–4 by 1–2 in.; midrib strong; veins obsolete; petiole ⅙ in. *Peduncles* short, glabrous. *Flowers* 1½ in. diam., white. *Sepals* orbicular, smooth, retuse; margins ciliate. *Petals* slightly pubescent externally towards the base.

Var. 1. *lanceolata,* Thwaites Enum. 40; young branches pilose, leaves narrow.

Var. 2. *elliptica,* Thw. l.c. (excl. syn. Gardner); young branches smooth, leaves broader.

5. **G. elliptica,** *Gard. in Calc. Journ. Nat. Hist.* vii. 448; leaves sessile broadly elliptic rounded at both ends retuse at the apex entire slightly coriaceous.

Ceylon; *Gardner,* Newera Ellia, *G. Thomson.*

A large tree. *Branchlets* with the leaves crowded at their extremities; bark cracking across and lengthwise. *Leaves* about 3 by 1½ in, upper surface reticulate-veined; midrib strongly marked below, channelled above. *Flowers* 2–3 in. diam., sessile, white. *Sepals* orbicular, emarginate, puberulous externally. *Petals* obcordiform, puberulous

Capsule 1–1½ in.; back of valves sulcate.—Thwaites does not appear to have seen specimens of this plant, which differs from *G. zeylanica* in its sessile, more coriaceous leaves with slightly revolute margins when dry, and its larger flowers.

6. **G. speciosa,** *Thwaites Enum.* 40; leaves sessile broadly elliptic rounded and retuse at the apex entire coriaceous. Carria speciosa, *Gard. in Calc. Journ. Nat. Hist.* vii. 7.

CEYLON; damp forests of the Central Province, rather uncommon, alt. 5000 ft. and upwards, *Gardner*, &c.

A tree 40–50 ft. *Branchlets* with the leaves crowded at their extremities; bark grey, cracking longitudinally. *Buds* glabrous. *Leaves* 3–5 by 1½–3 in., slightly revolute when dried; midrib strong, channelled above; veins obsolete. *Flowers* 2–4 in. diam., subsessile, reddish-purple. *Sepals* and *petals* orbicular-oblong, obcordate; sepals smooth, margins ciliate; petals faintly silky externally towards the base. *Capsule* 1½ in. long; back of valves sulcate above.

GORDONIA ANOMALA, *Spreng. Syst.* iii. 126, is figured in *Bot Reg.* 349, under the name of Camellia axillaris, *Roxb. ms.*, and is stated to have been introduced by Dr. Roxburgh into the Calcutta Botanic Garden from Pulo-Penang. I have seen, however, no specimens except from S. China, whence it is probably not indigenous in Penang.

13. CAMELLIA, Linn.

Trees or shrubs. *Leaves* evergreen, serrate, coriaceous or membranous. *Flowers* axillary, solitary, or aggregated, sessile or shortly stalked, often handsome. *Sepals* 5–6, unequal, graduating from the bracts towards the petals. *Petals* slightly coherent at the base. *Stamens* numerous, the outermost in many rows, slightly or almost wholly monadelphous, adherent to the base of the petals; the innermost, 5–12, free. *Ovary* 3–5-celled; styles free to the base, or more or less united; ovules 4–5 in each cell, pendulous. *Capsule* woody, usually short, loculicidal. *Seeds* mostly solitary in each cell, wingless, albumen 0; embryo straight, cotyledons thick, radicle short, superior.—DISTRIB. Trop. and East. Asia and Malay Archipelago. Species about 14.

SECT. I. **Thea,** *Linn.* *Flowers* nodding, *sepals* persistent.

1. **C. theifera,** *Griff. Notul.* iv. 558, t. 601, f. i. & iii.; *Trans. Agric. Soc. Calc.* v. (1838), t. C; leaves elliptic-oblong acute or cuspidate-acuminate puberulous on the nerves beneath, peduncles 2–3-bracteate short, styles and stamens glabrous. Thea chinensis, *Linn.; Seem. in Trans. Linn. Soc.* xxii. t. 61. T. assamica, *Masters in Journ. Agric. & Hort. Soc. Ind.* iii. (1844), 63. Assam Tea, *Wall. Journ. Asiat. Soc. Beng.* iv. 48, t. 2. Camellia? Scottiana, *Wall. Cat.* 3668, (see *Journ. Linn. Soc.* xiii. 328). Camelliæ sp., *Griff. Trans. Agric. & Hort. Soc. Ind.* v. (1838), t. B. Eurya angustifolia, *Miquel in Herb. Hohenack.* 483 (a cultivated form).

UPPER ASSAM, *Wallich;* CACHAR (*fide T. Anderson*).—DISTRIB. China.

A shrub, 3–6 ft. high. *Branchlets* glabrous; buds silky. *Leaves* 4–8 by 1½–2½ in. tapering at either end, more or less serrate, membranous; petiole ⅙ in. *Flowers* 1¼ in. diam., white. *Sepals* orbicular, glabrous, with membranous ciliate edges. *Petals* broadly obovate. *Styles* united for ⅔ their length. *Capsule* leathery, trigonous; cells 1- rarely 2-seeded. *Seeds* ¾ in. diam., nearly globose or obtusely angled, smooth, pale brown.—Possibly the wild stock of the tea plant. The cultivated forms vary with more contracted habit, smaller, more obtuse and coriaceous leaves, and a pubescent calyx. In *J. W. Bennett's Ceylon,* 277, the Tea plant is alluded to and figured as having been found in that island by the Dutch. This, however, was not confirmed by the writer or by any subsequent observer.

2. **C. caudata,** *Wall. Pl. As. Rar.* iii. 36; leaves elliptic-oblong caudate-acuminate sparsely puberulous beneath, peduncles imbricate-bracteate short, stamens and styles hairy. *Wall. Cat.* 978; *Griff. Notul.* iv. 559, t. 601, f. ii.; *Trans. Agric. & Hort. Soc. Ind.* v. (1838), t. A.

Khasia Mts. and Silhet, *Wallich*, &c.; Bhotan Himalaya, *Booth;* Mishmi Hills, *Griffith.*

Branchlets slender; buds silky. *Leaves* 3–4 by $\frac{3}{4}$–1 in., serrate, membranous with a strong midrib pubescent beneath; petiole $\frac{1}{6}$ in., pubescent. *Flowers* about 1 in. diam., white. *Sepals* ovate, silky externally. *Petals* obovate, puberulous externally. *Capsule* $\frac{3}{4}$ in. diam., trigonously-spherical, 1-celled, 1-seeded.

Sect. II. **Camellia** proper. *Flowers* erect, *sepals* deciduous.

3. **C. drupifera,** *Lour. Fl. Cochin.* 411, *ex Seem. in Trans. Linn. Soc.* xxii. 344; leaves elliptic or elliptic-oblong tapering below with a long acuminate apex coriaceous, stamens glabrous, styles nearly free woolly at the base. C. Kissi, *Wall. in As. Res.* xiii. 429; *Journ. As. Soc. Beng.* iv. 48, t. 2; *Pl. As. Rar.* iii. 36, t. 256. C. keina, *Don Prodr.* 224. C. mastersia, *Griff. Notul.* iv. 539. C. simplicifolia, *Griff. Notul.* iv. 560, t. 604, f. ii. C. symplocifolia, *Griff. Itin.* 40. C. caudata, *Griff. Itin.* 40 (*not of Wall.*). C. oleifolia, *Wall. Cat.* 976.

Eastern Himalaya; alt. 3–7000 ft.; from Nipal, *Wallich*, to Bhotan, *Griffith;* Assam and Khasia Mts., alt. 5–8000 ft.; Tenasserim and Andaman Islands, *Helfer.*

A shrub or small tree, with much divided slender branches. *Branchlets* slightly puberulent; buds with loose scales, sparingly pubescent. *Leaves* 3–4 by 1–$1\frac{1}{2}$ in., serrulate especially towards the apex, often slightly revolute; veins faint; petiole $\frac{1}{4}$ in. *Flowers* $1\frac{1}{2}$ in. diam, white, with the odour of cherry-laurel. *Sepals* orbicular, silky externally. *Petals* obovate, emarginate, scarcely hairy externally. *Ovary* woolly. *Capsule* nearly 1 in. diam., at first pyriform and pubescent, ultimately depressed-globose and smooth. *Seeds* 1–3.—*C. Sasanqua*, of China and Japan, has less acuminate leaves, obcordate or 2-lobed petals and connate styles.

4. **C. lutescens,** *Dyer;* leaves elliptic-oblong tapering or rounded below caudate-acuminate membranous, styles short, stigmas recurved, capsule drupaceous (when young only ?).

Mishmi Hills, high up on Laim-planj-thaya, *Griff. Journ.* p. 38, *Kew Distrib.* 777 *and* 779.

A shrub with much divided pale grey branches and buds silky within, *Leaves* 2–$3\frac{1}{2}$ by 1–$1\frac{1}{4}$ in., closely serrate; midrib prominent below and pale; petiole $\frac{1}{3}$ in. puberulous. *Flowers* 1 in. diam., crowded towards the ends of the branches, sessile, white, then yellowish, fragrant. *Sepals* orbicular, membranous, thinly pubescent internally. *Petals* obovate, smooth. *Ovary* with long silky hairs.

5. **C. ?** *sp. n.;* a shrub 10 ft. with puberulous shoots and pubescent buds and petioles. Leaves 4–7 by $1\frac{1}{2}$–2 in., oblong, tapering at both ends, crenate serrate, obtuse acuminate, papery, glabrous on both surfaces; petiole $\frac{1}{3}$ in. Flowers 1 in. diam. erect; the orbicular, minutely mucronate sepals and obovate petals both pubescent externally; styles 5, distinct, very short; ovary silky.

Moulmein, *Lobb*, alt. 3000 ft.; a single specimen.

I have no means of identifying the plant found by Griffith on the Mishmi mountains (*Journ.* 38 *and* 45), and called by him *Camellia axillaris.*

14. **ARCHYTÆA,** Martius.

Leaves evergreen, semiamplexicaul, smooth. *Flowers* on a lateral compressed peduncle, 3 or more together, rarely solitary *Bracts* subfoliaceous.

Sepals and *petals* each 5. *Stamens* numerous, 5-adelphous; anthers versatile. *Ovary* 5-celled; styles distinct or wholly united; ovules numerous in many imbricating rows. *Capsule* acuminate, septicidal from below, with a persistent central axis. *Seeds* linear-subcylindric, albumen scanty. —DISTRIB. Trop. Amer. and Indian Archipelago. Species 3.

1. **A. Vahlii,** *Choisy Mém. Ternstr.* 73. Hypericum alternifolium, *Vahl Symb.* ii. t. 42; *DC. Prodr.* i. 545; *Wall. Cat.* 4806. Ploiarium elegans, *Korth. Verh. Nat. Gesch. Bot.* 135, t. 25.

EASTERN PENINSULA; Malacca, *Griffith;* Singapore, *Wallich;* Penang, *Jack.*—DISTRIB. Borneo.

A shrub or small tree. *Leaves* crowded at the ends of the branches, narrow oblanceolate, acute; margins and midrib red. *Flowers* 1 in. long, pink. *Styles* ½ in. long, distinct.

A plant of which I have seen only specimens in fruit, collected by Maingay at Penang, and described below, is probably the type of a new Ternstrœmiaceous genus.—*Leaves* alternate, 2–3 by 1–1½ in., elliptic, acute, coriaceous, with close patent lateral veins; petiole 1 in. *Flowers* from the axils of fallen leaves, forming a terminal panicle; peduncle ¾ in. long, thickened upwards. *Sepals* 5, imbricate. Immature *fruit* ovoid, apiculate, drupaceous, containing 2 1-seeded cells.

ORDER XXV. DIPTEROCARPEÆ. (By W. T. Thiselton Dyer.)

Resinous trees, rarely climbing shrubs. *Leaves* alternate, simple, quite entire, rarely sinuate-crenate, with parallel lateral nerves; stipules usually small and deciduous, or inconspicuous, sometimes larger and persistent, or fugitive, leaving an annular scar. *Flowers* usually sweet-scented in few- or many-flowered axillary and terminal racemes or panicles. *Bracts* usually minute or 0, rarely larger and persistent. *Calyx-tube* free and campanulate, or very short and adnate to the base of the ovary. *Petals* contorted, connate at the base or free. *Stamens* ∞, 15, 10 or 5, hypogynous or subperigynous, free, connate, or adnate to the petals, filaments short, often dilated at the base; anthers 2-celled, the outer valves sometimes larger, connective often aristate or with an obtuse appendage. *Ovary* slightly immersed in the torus, usually 3- rarely 2- or 1-celled; style subulate or fleshy, entire or with 3 minute stigmatic lobes; ovules anatropous, 2 in each cell, pendulous or laterally affixed (solitary and erect in *Ancistrocladus*). *Fruit* usually nut-like, sometimes capsular and 3-valved, 1- rarely 2-seeded, accompanied by the variously accrescent calyx of which two or more lobes are usually developed into linear wings. *Seed* exalbumous (albumen fleshy and ruminated in *Ancistrocladus*); cotyledons fleshy, equal or unequal, straight or more or less plaited and crumpled; radicle directed towards the hilum, usually included between the cotyledons.—DISTRIB. Confined (except 3 Tropical African species) to Tropical Eastern Asia; genera about 13, species about 170.

* Calyx much enlarged in fruit, segments erect.

Calyx in fruit with a distinct tube.
  Fruit free . . . . 1. DIPTEROCARPUS.
  Fruit adnate to the calyx.
    All the calyx-lobes enlarged. Stamens 5–10, ovary 1-celled . . . . 2. ANCISTROCLADUS.
    Two calyx-lobes enlarged. Stamens ∞, ovary 3-celled . . 3. ANISOPTERA.

Calyx in fruit with an obscure tube.
  Æstivation of the calyx subvalvate; stamens 15 . . . . 4. Vatica.
  Æstivation of the calyx imbricate.
    Three or all the calyx-segments enlarged; stamens 15–∞, subulate-cuspidate . . . . 5. Shorea.
    Two calyx-segments enlarged; stamens 10–15, subulate-cuspidate . . . . 6. Hopea.
    Two calyx-segments enlarged; stamens 15, with an obtuse appendage . . . . 7. Doona.
** Calyx scarcely enlarged in fruit, segments reflexed.
  Stamens 15–∞ . . . . 8. Vateria.
  Stamens 5 . . . . 9. Monoporandra.

1. DIPTEROCARPUS, Gærtn. f.

Lofty trees, stellately pubescent or more or less clothed with fascicled hairs. *Leaves* coriaceous, entire or sinuate-crenate, lateral nerves not quite opposite, connected by marginal loops and transverse reticulations; petiole usually more or less tumid at the apex; stipules large, valvate, enclosing the terminal bud, finally caducous leaving an annular scar. *Flowers* large, racemed, white or reddish. *Calyx-tube* free. *Petals* usually pubescent externally especially on the outer margin. *Stamens* ∞; anthers linear, equivalved, acuminate. *Ovary* 3-celled; style filiform; ovules 2 in each cell. *Fruit* nut-like, 1- rarely 2-seeded, inclosed in the accrescent calyx-tube, free; wings 2, erect. *Seed* adnate to the base of the pericarp; cotyledons large, thick, unequal; radicle inconspicuous.—Distrib. Tropical E. Asia; species about 50.

* *Calyx-tube* in fruit without ribs or wings.

† *Young branches glabrous or canescent.*

1. **D. turbinatus,** *Gærtn. f. Fruct.* iii. 51, t. 188; leaves ovate or broadly lanceolate entire or sinuate-crenate acute base rounded, fruit-wings 5 by 1 in. linear-oblanceolate obtuse 3-nerved. *Ham. in Mem. Wern. Soc.* vi. 300; *Roxb. Fl. Ind.* ii. 612; *Corom. Pl.* iii. 10, t. 213; *Wall. Cat.* 952; *A. DC. Prodr.* xvi. 2, 607. D. lævis, *Ham. l.c.* 299; *A. DC. l.c.* D. indicus, *Bedd. Forest Rep.* 1864–5, 17 *with tab.*

Eastern Bengal and Eastern Peninsula, from Chittagong and Pegu to Sincapore. (Concan and Ceylon cult.?)

Young *branches* compressed. *Leaves* 5–12 by 2½–7 in.; glabrous on both surfaces or slightly pubescent, especially on the nerves and margins, lateral nerves 14–18 pairs; petiole 1½–3 in.; stipules with dense stellate canescence, pubescent towards the apex. *Racemes* 3–5-flowered. *Flowers* 3 in. diam. *Calyx-tube* obconic, hoary-puberulous; in fruit 1 in. diam., sub-spheroidal, mouth contracted, unenlarged lobes deltoid-ovate. *Petals* pinkish-white. *Nut* pubescent.—The Gurjun oil tree.—Kanyin.

2. **D. vestitus,** *Wall. Cat.* 954; leaves elliptic obtuse at both ends, margins sinuate-crenate and ciliate.

Tavoy, *Gomez.*

Young *branches* compressed, clothed in every part except the glabescent upper surfaces of the leaves with stellate canescence. *Leaves* 7 by 5 in., margins undulate, lateral nerves 15 pairs; petiole 1½ in. *Racemes* about 6-flowered. *Calyx-tube* obtusely obconic; lobes short, broadly deltoid, obtuse.—I have seen no fruit.

†† *Young branches more or less hairy.*

3. **D. obtusifolius,** *Teysm. in Miq. Ann. Mus.* i. 214; leaves broadly

ovate obtuse sinuate-crenate, base rounded, fruit-wings 5 by 1 in. linear-oblanceolate 1- or sub-3-nerved. *A. DC. Prodr.* xvi. 2, 608.

MOULMEIN and RANGOON, *Griffith*, &c.; ascending 3000 ft., *Brandis*.—DISTRIB. Siam.

The compressed young branches, stipules and petioles densely hairy. *Leaves* 8–9½ by 4–5½ in., glabrous above, softly pubescent beneath, margins undulate sometimes ciliate, lateral nerves 12–14 pairs; petioles 1–1½ in. *Calyx tube in fruit* 1¼ in. diam., depressed spheroidal, mouth contracted, sparsely hispid, at length glabrous, unenlarged lobes cordiform. *Nut* silkily pubescent.—Engnu. Kan.—In Indian specimens the margins of the leaves are smooth, in those from Siam, their upper surface is glabrescent. A plant collected in Pegu by Kurz differs in the stiffly-tomentose young parts, subobtuse leaves, and acute fruit-wings.

4. **D. hispidus,** *Thwaites Enum.* 33; leaves broadly elliptic-oblong shortly acuminate base slightly cordate sinuate-crenate, fruit-wings 6 by 1½ in. linear-obovate obtuse, principal nerve with 3–4 strong ascending branches. *A. DC. Prodr.* xvi. 2, 608.

CEYLON; Saffragam District and Ratnapoora.

Young branches, stipules, petioles and the prominent reticulations on the under surface of the leaves clothed with spreading rufous fascicled hairs. *Leaves* 5–12 by 3½–7 inch. (25 by 11 on young trees), lateral nerves 15–24 pairs; petiole 1–2½ in. *Calyx-tube* obconic, densely pubescent, in fruit ovoid, obscurely 5-angled, glabrescent. *Nut* striate, glabrescent.—D. oblongifolius, *Thw. Enum.* 33 (*not of Blume*). D. oblongus, *A. DC. Prodr.* xvi. 2, 608, is said by Thwaites to have smaller leaves, but appears to me in other respects indistinguishable.

5. **D. pilosus,** *Roxb. Hort. Beng.* 93; *Fl. Ind.* ii. 615; leaves elliptic-oblong very shortly acuminate base acute or rounded margins with fascicled cilia, fruit-wings 6–8½ by 1¼–1¾ in. linear-oblong retuse usually strongly 3-nerved glabrous. *A. DC. Prodr.* xvi. 2, 614. D. Baudii, *Korth. Verh. Nat. Gesch. Bot.* 59, t. 5; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 65; *A. DC. Prodr. l.c.* 609.

ASSAM, *Griffith;* PEGU and CHITTAGONG, *Roxburgh*, &c.; ANDAMAN ISL., *Kurz*.—DISTRIB. Sumatra.

Compressed young branches, stipules and petioles densely hairy. *Leaves* 6–18 by 3–12 in., glabrous above, sparingly hairy on the reticulations beneath, lateral nerves 24 pairs; petiole 1½–3 in. *Calyx-tube* in fruit 2 in. long, ovoid or obovoid, glabrous, mouth not contracted, unenlarged lobes orbicular. *Nut* densely pubescent.—An Assam plant collected by G. Mann has identical fruits but leaves 7 by 4 in., elliptic, acute, base rounded, minutely tawny-pubescent beneath.

6. **D. crinitus,** *Dyer;* leaves obovate acute margins entire slightly recurved when dried fringed with short fascicled hairs, fruit-wings (immature) 3½ in. linear deltoid obtuse or acute 3-nerved.

MALACCA, *Maingay*.—DISTRIB. Borneo.

Young branches, petioles, prominent nerves on the under surface of the leaves and pedicels clothed with long fascicled hairs. *Leaves* 4–6 by 2–3½ in., coriaceous, thinly hairy above especially on the midrib, lateral nerves 15–18 pairs; stipules glabrous except a few fascicled hairs on the dorsal nerve; petiole 1¼–1½ in. *Racemes* about 6-flowered. *Calyx-tube* obconic, glaucous, obovoid in immature fruit, contracted below the mouth, glabrous, unenlarged lobes broadly elliptic.

** *Calyx-tube* in fruit 5-angled or winged.

† *Angles confined to the upper portion of the calyx-tube.*

7. **D. cornutus,** *Dyer;* leaves oblong rounded at both ends or tip apiculate sinuate-crenate, calyx-tube in fruit tubercular-pentagonal above, mouth contracted.

MALACCA, *Maingay.*
Young branches compressed, canescent. *Leaves* 10–13 by 4–8 in., glabrous above, canescent beneath, lateral nerves 19 pairs with a persistent intermediate plication; petiole 2 in.; stipules 4–6 in., canescent with scattered fascicled hairs. *Racemes* 4–6 in., simple, about 8-flowered. *Calyx-tube* in fruit ⅝ in. long, glabrous, wings linear-spathulate.

8. **D. tuberculatus,** *Roxb. Fl. Ind.* ii. 614; leaves cordiform acute base cordate or truncate margins sinuate-crenate undulate, calyx-tube in fruit pentangular-costate in its upper part, mouth contracted. *A. DC. Prodr.* xvi. 2, 614. D. cordatus, *Wall. Cat.* 956; *A. DC. l.c.* 612. D. grandifolius, *Teysm. in Miq. Ann. Mus.* i. 214.

CHITTAGONG, *Roxburgh;* RANGOON, *McClelland;* Birmah, *Wallich.*—DISTRIB. Siam.
Young branches compressed, glabrous or canescent. *Leaves* 10–18 by 5–14 in., lateral nerves 15 pairs; petiole 4–5 in.; stipules 3–5 in. *Racemes* 5–6 in., simple or 2-fid, 4–7-flowered. *Flowers* large, rose-coloured. *Calyx-tube* in fruit 1¼ by 1 in., wings 4½–5 by 1¼–1½ in., linear-elliptic, obtuse, 3-nerved.—Enben.
VAR. *grandiflora,* Wall. Cat. 957 (sp.), every part canescent, racemes 8 in. 9-flowered. —Attran.
I could not agree with Kurz (*Journ. As. Soc. Beng.* 1870, ii. 64, but corrected in *Regensb. Flora,* 1872, 189), that the foliage of *D. cordatus,* Wall. (not *cordifolius,* as cited) is identical with that of *D. obtusifolius.* Miquel describes the calyx-tube in fruit as "exalatus;" it does not appear however that he ever saw it mature.

†† *Angles or wings prolonged to the base of the calyx-tube or nearly so.*

a. Angles costate.

9. **D. zeylanicus,** *Thwaites Enum.* 33; leaves elliptic or ovate-oblong slightly apiculate base rounded margins faintly crenate, calyx-tube in fruit urceolate. *A. DC. Prodr.* xvi. 2, 610.

CEYLON, ascending to 3000 feet.
Young branches, compressed, glabrous. *Leaves* 8 by 4 in., lateral nerves 17–22 pairs; petiole 1½–2 in. [*Racemes* 2-fid near the base, 6–12-flowered. *Thw.*] *Petals* blood-red with pale yellowish margins. *Calyx-tube* in fruit 1 in. long; wings 5–7½ in., linear-oblong, obtuse, sub-3 nerved, unenlarged lobes ¾–1 in., ovate-oblong, obtuse. *Nut* densely canescent.

β. Angles winged.

10. **D. scaber,** *Ham. in Mem. Wern. Soc.* vi. 300; leaves oblong-ovate acute base slightly cordate, racemes 4–9-flowered, calyx-tube in fruit obovoid pilose angles with narrow membranous wings. D. alatus, *A. DC. Prodr.* xvi. 2, 611 *in part, not of Roxb.*

EASTERN BENGAL; Mountains in Southern Tippera, *Hamilton.*
Clothed with brown fascicled hairs; young branches subcompressed. *Leaves* about 4 by 2 in., pilose on both surfaces, lateral nerves 12 pairs; petiole ¾ in. *Calyx-tube* in fruit ¾ in., pilose, mouth contracted, fruit-wings 3 in., linear oblong obtuse.

11. **D. glandulosus,** *Thwaites Enum.* 34; leaves oblong-lanceolate acuminate base acute margins slightly ciliate, racemes 2–3-flowered, flowers shortly pedicelled (calyx-tube in fruit subglobose the angles with wings broadest in the middle but not reaching to the pedicel. *Thw.*). *A. DC. Prodr.* xvi. 2, 612.

CEYLON; Saffragam and Ambagamowa districts, *Thwaites.*
The subcompressed young branches, petioles and stipules stellately puberulent and thinly hairy. *Leaves* 4–6 by 2–2½ in., glabrous above, glandular-puberulous beneath, lateral nerves 11 pairs; petiole ¾–1 in. [*Fruit-wings* (calyx-lobes) 3–4 by ¾ in. *Thw.*] *Petals* about 1¼ in. long, yellow.

12. **D. scabridus,** *Thwaites Enum.* 34; leaves elliptic-oblong acuminate base rounded margins ciliate, calyx-tube in fruit subglobose with distant stellate hairs angles with undulate wings ⅛ in. wide reaching to the pedicel. *A. DC. Prodr.* xvi. 2, 612.

CEYLON; near Ratnapoora, *Thwaites.*

Young branches, petioles, and the under surface of the midrib with appressed hairs. *Leaves* about 7 by 2¾–3 in., glabrous above, glabrescent beneath except on the midrib and nerves, lateral nerves 12–15 pairs; petiole ¾ in. *Fruit-wings* (calyx-lobes) 4 by 1 in. linear-lanceolate, obtuse.

13. **D. alatus,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 614; leaves ovate or elliptic acute, calyx-tube in fruit globose angles with wings ⅓ in. broad. *Wall. Cat.* 953; *A. DC. Prodr.* xvi. 2, 611 *in part.* D. costatus, *Gærtn. f. Fruct.* iii. 50, t. 187 (bad). D. gonopterus, *Turcz. in Mosc. Bull.* 1863, 576; *A. DC. Prodr.* xvi. 2, 612. Oleoxylon balsamiferum, *Wall. Cat.* p. 157.

CHITTAGONG, BIRMA, TENASSERIM, ANDAMAN ISLANDS.—DISTRIB. Siam.

Young branches compressed, pubescent. *Leaves* 5½ by 3 in., shining above, more or less pubescent beneath, margins ciliate, lateral nerves 15 pairs; petiole 1½ in., softly pubescent-hairy; stipules pilose. *Racemes* about 7-flowered. *Calyx-tube* in fruit 1 in. diam., smooth, fruit-wings (calyx-lobes) 4–5 by 1 in., linear-ovate or spathulate, obtuse, 3-nerved, unenlarged lobes orbicular.—Kanyin.—Gærtner's figure is bad as is shown by Hamilton's specimens in the Banksian Herbarium, from which it appears to have been drawn; his specific name suits the drawing, but is inapplicable to the species. I have therefore adopted Roxburgh's.

14. **D. incanus,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 614; leaves ovate obtuse. *W. & A. Prodr.* 84; *A. DC. Prodr.* xvi. 2, 611.

CHITTAGONG, *Roxburgh;* PEGU, *Kurz.*

Young parts and compressed branches softly hairy-pubescent. *Leaves* 6 by 4½ in., thinly pubescent on both surfaces, margins ciliate, lateral nerves 12 pairs, pubescent beneath; petiole 2 in., softly pubescent. *Calyx-tube* (in flower) softly pubescent, strongly winged.

15. **D. insignis,** *Thwaites Enum.* 34; leaves ovate apiculate base obtuse, flowers subsessile, calyx-tube in fruit narrowly ovoid, angles with wings ¼ in. wide mouth scarcely contracted, fruit-wings (calyx-lobes) with one principal nerve. *A. DC. Prodr.* xvi. 2, 612.

CEYLON; Saffragam district, *Thwaites.*

Young branches densely pubescent ultimately glabrescent. *Leaves* 4–6 by 2½–3 in., glabrous above, pubescent or glabrous on the nerves beneath, margins sinuate-crenate, lateral nerves 11 pairs; petiole ½–¾ in., silky-pubescent, finally transversely rugose. *Racemes* 3–5 flowered. *Flowers* large. *Petals* 2½ in. long, yellow on the inner, reddish on the outer margin. *Calyx-tube* in fruit about 1 in. long; immature fruit-wings (calyx-lobes) 2¾–¾ in., linear-oblong, obtuse.

16. **D. pterygocalyx,** *Scheff. Obs. Phyt.* ii. 35; leaves elliptic ovate or oblong-ovate shortly and abruptly acuminate base truncate, calyx-tube in fruit ovoid angles with wings nearly ½ in. wide mouth slightly contracted, fruit wings (calyx-lobes) sub-3-nerved central nerve prominent.

MALACCA, *Maingay.*—DISTRIB. Banca.

Young branches subcompressed with deciduous canescence. *Leaves* 4–10 by 3–5 in., glabrous on both surfaces, margins sinuate-crenate and undulate, lateral nerves about 18 pairs, rather remote; petiole 2–3 in.; stipules pale, glabrous. *Racemes* about 5-flowered. *Calyx-tube* in fruit 2 in. long, glabrous; fruit-wings 7 by 1½–2 in., linear-oblong, obtuse, unenlarged lobes broadly ovate or orbicular.

17. **D. Griffithii,** *Miq. Ann. Mus. Bot.* i. 213; leaves ovate acute base rounded, calyx-tube in fruit oblong ovoid angles with wings fully ½ in. wide mouth uncontracted, fruit-wings with 3 parallel approximate nerves. *A. DC. Prodr.* xvi. 2, 612. D. grandiflorus, *Griff. Notul.* iv. 515, *not of Wall.*

MERGUI, *Griffith;* SOUTH ANDAMAN ISLAND, *Kurz.*

Young branches subcompressed, canescent. *Leaves* 6 by 4 in., glabrous on both surfaces, lateral nerves about 13 pairs; petiole 2–2½ in.,; stipules canescent. *Racemes* 3-4-flowered. *Calyx-tube* in fruit 2–3 in. long; fruit-wings (calyx-lobes) 5½–6 by 1–1¾ in., linear-spathulate, obtuse, sparingly reticulate, unenlarged lobes broadly deltoid.—Distinguished from *D. pterygocalyx* by the distinctly 3-nerved calyx-wings, and the unenlarged calyx-lobes not being contracted at the base. *D. Motleyanus,* Hook. f., from Borneo, is closely allied.

DOUBTFUL SPECIES.

D. ANGUSTIFOLIUS, *W. & A. Prodr.* 84; D. costatus, *Roxb. Fl. Ind.* ii. 613 (*not of Gærtn.*).—Chittagong.

2. ANCISTROCLADUS, Wall.

Smooth climbing shrubs with short supra-axillary often arrested and circinately hooked branches. *Leaves* usually in terminal tufts, coriaceous, entire, reticulately feather-veined; stipules small, caducous or inconspicuous. *Flowers* usually small, very caducous, in terminal or lateral panicles. *Calyx-tube* at first very short, adnate to the base of the ovary with imbricate lobes, finally turbinate and adnate to the fruit with the lobes unequally enlarged, spreading and membranous. *Stamens* 5 or 10, subperigynous. *Ovary* 1-celled, inferior; styles 3, articulated to a rounded or shortly cylindrical epigynous disk; ovule solitary, erect or laterally affixed. *Seed* subglobose, testa prolonged into the ruminations of the copious fleshy albumen; embryo short, straight; cotyledons short, divergent.—DISTRIB. Except *A. guineensis* in W. Tropical Africa confined to Tropical Asia and the Indian Archipelago. Species about 10.

* *Leaves* less than 4 times as long as wide.

† *Stamens* 5.

1. **A. Vahlii,** *Arn. in Nov. Act. Nat. Cur.* xviii. pt. i. 325. *Thw. in Trans. Linn. Soc.* xxi. 233, t. 24. Wormia hamata, *Vahl in Scrift. Nat. Selsk. Kjobenk.* 6, 105.

CEYLON; Central and Southern part, ascending to 2000 ft.

Leaves 4 by 1–1¼ in., sessile, cuneate-oblanceolate, obtuse. *Panicle* about twice 2-chotomous; divisions slender. *Calyx-tube* finally ½ in. long, exceeding the fruit, obconic, pentangular; enlarged lobes 1 in. long, oblong obtuse, obscurely parallel-nerved.

†† *Stamens* 10.

2. **A. extensus,** *Wall. Cat.* 1052 (1); panicle repeatedly 2-chotomous, divisions divaricate recurved, calyx-tube equalling the flat-topped fruit not furrowed, lobes slightly decurrent. *Planch. in Ann. Sc. Nat.* 3rd *ser.* xiii. 318. Ancistrolobus sp., *Griff. Notul.* iv. 568; Ic. t. 605, fig. ii.

PEGU and TENASSERIM, *Wallich, Helfer,* &c.

Leaves 5–12 by 2–3½ in., sessile, obovate-oblong, subobtuse or acute, narrowed below. *Bracts* ovate, acute. *Calyx-lobes* 1½ in. long, cuneate-obovate with about 3 subparallel nervules.

3. **A. Heyneanus,** *Wall. Cat.* 7262; panicle about twice 2-chotomous, calyx-tube furrowed exceeded by the conical apex of the fruit, lobes not decurrent. *Wight Ic.* 1987-88; *A. DC. Prodr.* xvi. 2, 602.

WESTERN PENINSULA; from the Concan to Travancor.

Leaves 6–11 by 2–3 in., sessile, elliptic-oblong, subacute, rather abruptly narrowed below, lateral veins remote and inconspicuous with loose reticulations between. *Enlarged calyx-lobes* in fruit 1½ in., spathulate, with numerous subparallel nervules.

4. **A. pinangianus,** *Wall. Cat.* 1054; panicle repeatedly 2-chotomous, divisions slender, calyx-tube furrowed exceeded by the conical apex of the fruit lobes decurrent. *Planch. in Ann. Sc. Nat. ser.* 3, xiii. 318; *A. DC. Prodr.* xvi. 2, 603.

PENANG, *Porter;* MALACCA, *Maingay.*—DISTRIB. Banca.

Leaves 5–11 by 2–3½ in., sessile, obovate-oblong, subobtuse, rather abruptly narrowed below, upper surface faintly reticulate. *Bracts* lanceolate. *Calyx-lobes* oblong-cuneate, obtuse, sparingly nerved.

** *Leaves* more than 4 times as long as wide.

5. **A. Wallichii,** *Planch. in Ann. Sc. Nat. ser.* 3, xiii. 319; panicle terminal or on short slender lateral branchlets 2–3 times 2-chotomous, bracts solitary ovate acute denticulate. *A. DC. Prodr.* xvi. 2, 602. A. extensus? *in part Wall. Cat.* 1052 (2). A. stelligerus, *Wall. Cat.* 1053; *A. DC. l.c.* 603.

PEGU and TENASSERIM, *Wallich,* &c. SILHET, *Da Silva.* CHITTAGONG, *H. f. & T.*

Branches tortuous. *Leaves* 9–12 by 1¼–1½ and 10–13 by 2–3 in., sessile, linear or linear-elliptic, obtusely acuminate or acute, gradually narrowed to the subauricled base, lateral veins remote, midrib prominent beneath. *Panicle* about 3 in. long. *Enlarged calyx-lobes* in fruit subequal, about ½ in. long, oblong-ovate, obtuse, spreading.—Planchon mistook the lateral branchlets in imperfect specimens for peduncles. To this species I refer foliage specimens collected by Drs. Hooker and Thomson in Chittagong.

6. **A. Griffithii,** *Planch. in Ann. Sc. Nat. ser.* 3, xiii. 318; panicle terminal repeatedly 2-chotomous divisions ascending slender flexuous, bracts in pairs linear acute.

TENASSERIM, *Griffith, Helfer.*

Branches tortuous. *Leaves* 7–9 by 1–1½ in., linear-obovate, obtusely acuminate, tapering below into a flat petiole about ¾ in. long. *Panicle* about 7 in. long.

7. **A. attenuatus,** *Dyer;* panicle terminal repeatedly 2-chotomous with stout divaricate divisions the ultimate ones recurved, bracts solitary, deltoid acute.

TENASSERIM and ANDAMAN ISLANDS, *Helfer* (*Kew Distrib.* 724).

Leaves 12–15 by 1½–1¾ in., cuneate-linear, sessile, gradually acuminate, midrib prominent, lateral nerves remote and inconspicuous. *Calyx-tube* in fruit furrowed, 2 lobes enlarged, ⅗ in. long, narrowly elliptic, obtuse, the rest half as long.

A. SAGITTATUS, Wall. Cat. 1055, A. DC. Prodr. xvi. 2, 603, is a *Tetramerista.*

3. ANISOPTERA, Korth.

Resinous trees. *Leaves* coriaceous, entire, feather-veined and finely reticulate; stipules small, fugacious or inconspicuous. *Flowers* in lax terminal panicles. *Calyx-tube* very short, adnate to the base of the ovary, segments imbricate, then subvalvate. *Stamens* ∞; anthers ovoid with a long subulate connective, outer valves larger. *Ovary* 3- (rarely 4–5-) celled; style fleshy, ovoid or oblong, with an attenuate 3–5-fid apex; ovules 2 in each cell. *Capsule* adnate to the calyx-tube, indehiscent, 1-seeded, crowned by the accrescent calyx-segments, of which 2 form linear wings. *Cotyledons* fleshy, unequal; radicle superior.—Distrib. Malay Peninsula, and Archipelago to New Guinea. Species about 5.

1. **A. oblonga,** *Dyer.*

Mergui, *Griffith.*

Twigs with smooth pale bark, young parts sparingly furfuraceous with fascicled hairs. *Leaves* 3½–5 by 1¾–2 in., oblong, or oblong-ovate, shortly acuminate, base rounded, shining above, minutely impress-punctate beneath; lateral nerves 18 pairs; petiole 1 in.; stipules pubescent. *Panicle* about 5 in. long. *Calyx-tube* in fruit ⅓ in. long; wings 4 in., linear-oblanceolate, obtuse, with 3 oblique, parallel, unequally prominent nerves.

A. glabra, *Kurz ms.* (a native of Birma) is only known to me from the fruit. The wings are 6 by ¾ in., and the triple nerves are not oblique and are equally prominent.

4. VATICA, Linn.

Small or moderate-sized resinous trees. *Leaves* coriaceous, entire, feather-veined and finely reticulate; stipules small, fugacious or inconspicuous. *Flowers* in axillary and terminal panicles, usually tomentose before expansion. *Calyx-tube* very short, adnate to the base of the ovary; segments somewhat acute, imbricate then subvalvate. *Stamens* 15; anthers oblong, external valves larger, connective apiculate. *Ovary* 3-celled; style short, subulate or apex clavate or capitate, stigma entire or 3-toothed; ovules 2 in each cell. *Capsule* leathery, 3-valved (or indehiscent?), 1–2-seeded, supported by the spreading accrescent calyx, two segments of which often expand into linear wings. *Cotyledons* fleshy.—Distrib. Tropical Asia and Indian Archipelago. Species about 25.

Sect. I. **Euvatica.** *Benth. & Hook.* *Fruiting-calyx* with 2 wing-like segments.

1. **V. grandiflora,** *Dyer;* leaves 5–8 in. long oblong or oblong-lanceolate shortly acuminate base rounded lateral nerves 12–15 pairs, petiole ¾ in. Hopea grandiflora, *Wall. Cat.* 958; *A. DC. Prodr.* xvi. 2, 634. Synaptea odorata, *Griff. Notul.* iv. 516, t. 585 A. f. 5, *fide Kurz in Journ. As. Soc. Beng.* 1870, ii. 65. S. grandiflora, *Kurz, l.c.* Anisoptera odorata, *Kurz in Regensb. Flora*, 1872, 190.

Martaban, Tenasserim, and Singapore, *Wallich,* &c.

Young parts densely furfuraceous with tawny fascicled hairs. *Leaves* 2–2½ in. broad. *Panicles* ⅓–½ the length of the leaves. *Calyx-segments* oblong, acute. *Petals* with pale brown tomentum externally in bud, pink. *Ovary* tomentose; stigma capitate, 3-lobed. *Fruit-wings* 2¼ by ½ in., linear-oblanceolate, abruptly contracted below, 5-nerved.

2. **V. faginea,** *Dyer;* leaves about 4½ in. long elliptic-oblong subobtuse base tapering or rounded lateral nerves about 10 pairs, petiole ½ in. Hopea faginea, *Wall. Cat.* 963.

Tenasserim; at Mergui, *Griffith, Helfer.*

A bush or small tree; the young parts with pale tomentum. *Leaves* 1½–2 in. broad. *Panicles* lax, ½–⅔ the length of the leaves, occasionally contracted. *Calyx-segments* oblong-lanceolate, obtuse. *Petals* tomentose externally in bud, blood-red. *Fruit-wings* 1½–2¼ by ⅝ in., linear-elliptic or -lanceolate, base more or less contracted, 3-nerved.—Not sharply distinguished from *V. grandiflora* except by the difference in *facies* and the smaller foliage.

3. **V. scaphula,** *Dyer;* leaves 4–6½ in. long elliptic-oblong apex shortly acuminate or obtuse base rounded lateral nerves about 16, petiole ¾–1¼ in. Hopea scaphula, *Roxb. Hort. Beng.* 93; *Flor. Ind.* ii. 611.

Chittagong coast at Mascal Island, *Roxb.*

A tree; twigs pale brown, glabrous, young parts with pale grey tomentum. *Leaves* $1\frac{3}{4}$–$2\frac{3}{4}$ in. broad, glabrous on both surfaces, paler beneath, midrib prominent. *Panicle* 5 in.; pedicels $\frac{1}{6}$ in. *Flowers* $\frac{3}{4}$ in. diam. *Calyx-segments* with dense hairy tomentum. *Petals* glabrescent externally, white.

4. **V. Maingayi,** *Dyer;* leaves about $3\frac{1}{2}$–5 in. long oblong or oblong-obovate abruptly acuminate base rounded, lateral nerves 12 pairs, petiole $\frac{3}{4}$–$1\frac{3}{4}$ in.

Malacca, *Maingay.*

Young parts with rusty furfuraceous tomentum. *Leaves* $1\frac{1}{2}$–2 in. broad. *Panicles* rather dense, fully $\frac{1}{2}$ shorter than the leaves. *Calyx-segments* oblong-lanceolate. *Fruit-wings* 2 by $\frac{1}{3}$ in., linear-oblong, obtuse or subacute, scarcely contracted at the base.

5. **V. Helferi,** *Dyer;* leaves $4\frac{1}{2}$–$5\frac{1}{2}$ in. long oblong obtuse base cordate under surface clothed with minute tomentose canescence lateral nerves 12 pairs, petiole $\frac{1}{3}$ in.

Tenasserim; at Mergui, *Helfer.*

Young parts of inflorescence and pedicels with pale-brown soft puberulence. *Leaves* $2\frac{1}{2}$–3 in. broad, midrib and veins rather prominent beneath. *Panicles* about 6 in., terminal, narrow. *Calyx* and *petals* in bud clothed with silky pubescence. *Fruit* unknown.

Sect II. **Isauxis,** *Arn.* *Fruiting-calyx* with equal segments.

6. **V. lanceæfolia,** *Blume Mus. Bot.* ii. 31; young parts pulverulent but soon glabrous, leaves elliptic-lanceolate acuminate base tapering paler beneath lateral nerves 15 pairs, ascending. *A. DC. Prodr.* xvi. 2, 618. V. canaca, *Ham. in Wall. Cat.* 4405 B. Vateria lanceolaria, *Roxb. Hort. Beng.* 42? V. lanceæfolia, *Roxb. Fl. Ind.* ii. 601; *Wight Ill.* i. 88. V. lanceolata, *Roxb.* (*by error*), *W. & A. Prodr.* 84; *Wall. Cat.* 4405. Retinodendron lanceæfolium, *Korth. Verh. Nat. Gesch. Bot.* 56. Seidlia lanceæfolia, *Kostel, allg. med. pharm. Flora* 1945 (*ex DC. Prodr.*).

Eastern Himalaya and Eastern Bengal and Silhet, *Wallich;* Khasia Mts. Assam and Bhotan, *Griffith,* &c.

A middle-sized tree. *Leaves* 7–11 by 2–$2\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in. *Panicles* $\frac{2}{3}$ the length of the leaves. *Flowers* fragrant. *Calyx-segments* ovate, acute. *Petals* $\frac{2}{3}$ in., cuneate white. *Ovary* pubescent; stigma clavate, 3-toothed. *Capsule* ovoid.

7. **V. Roxburghiana,** *Blume Mus. Bot.* ii. 31, t. 7; young parts with lepidote canescence, leaves lanceolate acute base rounded or retuse, lateral nerves 10 pairs. *Miq. Ann. Mus. Bot.* i. 214; *Thwaites Enum.* 404; *A. DC. Prodr.* xvi. 2, 618. V. chinensis, *Linn.; Smith Ic. ined.* t. 36; *DC. Prodr.* i. 517. Vateria Roxburghiana, *Wight Ill.* i. 88; *Ic.* t. 26.

Western Peninsula; from Canara southwards. Ceylon, *Thwaites.*

Leaves $4\frac{1}{2}$–$8\frac{1}{2}$ by $1\frac{1}{2}$–3 in.; petiole $1\frac{1}{2}$–2 in. *Panicles* axillary, $\frac{1}{3}$–$\frac{1}{2}$ the length of the leaves. *Calyx-segments* ovate-deltoid, acute, in fruit nearly $\frac{3}{4}$ in long, lanceolate (*Stigma* 6-dentate, *Blume.*) *Capsule* ovoid, ultimately globose, 3-sulcate.—A fragmentary specimen collected by Griffith at Mogoung, Birma, appears to belong to this species.

8. **V. pallida,** *Dyer;* young parts hoary, leaves narrowly elliptic or linear-elliptic or oblanceolate cordate-acuminate base acute or obtuse lateral nerves about 9 ascending curved midrib prominent above.

Penang, *Maingay.*

A small tree, twigs slender, slightly flexuose, pale-barked. *Leaves* 5–7 by 1–2 in.

olive-coloured, shining above, pale and opaque beneath; petiole ⅓ in., thickened. *Panicles* 1–1½ in., mostly axillary. *Calyx-segments* narrowly-deltoid, acute, at length deflexed, pubescent. *Petals* pubescent externally. *Anthers* apiculate. *Ovary* pubescent; style $\frac{1}{24}$ in., stigma capitate, lobulate. *Fruit* unknown.—Notwithstanding the deflexed calyx this species appears to find its most natural position here.

9. **V. affinis,** *Thwaites Enum.* 404; young parts nigrescent nearly glabrous, leaves lanceolate or oblong-lanceolate acuminate base rounded lateral nerves about 6 pairs ascending curved, midrib prominent above. *A. DC. Prodr.* xvi. 2, 619. Isauxis Roxburghiana, *Thwaites Enum.* 37, *not of Wight.*

Ceylon; at Hinidoon Pattoo and Pasdoon Corle, *Thwaites.*

A large tree. *Leaves* 4½–5½ by 2–3 in., both surfaces glabrous, shining above, paler beneath; petiole 1 in. *Panicles* axillary and terminal, ⅓–½ the length of the leaves; pedicels and buds pubescent. *Calyx-segments* lanceolate, acute, in fruit ovate 3-nerved.

10. **V. scabriuscula,** *A. DC. Prodr.* xvi. 2, 620; young parts with tawny stellate pubescence, leaves oblong-lanceolate obtusely acuminate base obtuse lateral nerves about 25 pairs spreading the alternate ones fainter. Vateria (Stemonoporus) scabriuscula, *Thwaites Enum.* 404.

Ceylon; at Hinidoon Pattoo and Pasdoon Corle, *Thwaites.*

A large tree. *Leaves* 4½–5½ by 1½–2 in., on young shoots 11 by 2½ in., glabrous above, scabrid beneath, midrib channelled above, very prominent beneath; petiole ½–¾ in. *Inflorescence* axillary and terminal, racemose; bracts caducous, ovate, acute, palely tomentose. *Anthers* with a few scattered hairs. *Style* cylindric, slender, truncate.—I have only seen immature flowers of this, but the anthers perfectly agree with *Vatica* and are unlike those of *Vateria.*

11. **V.? disticha,** *A. DC. Prodr.* xvi. 2, 620; young twigs with minute tawny appressed pubescence, leaves oblong strongly acuminate base rounded, lateral nerves about 10 faint ascending. Vateria (Stemonoporus) disticha, *Thwaites Enum.* 404.

Ceylon; at Hinidoon Pattoo and Pasdoon Corle, *Thwaites.*

A large tree. *Leaves* 5 by 1½–2 in., glabrous above, glabrescent beneath, coriaceous, lateral nerves slightly prominent, midrib channelled above; petiole ⅓ in. *Panicles* axillary and terminal, imbricate-bracteate when young; bracts ⅓ in., distichous, ovate, ciliate, the lowest with appressed fulvous pubescence, the uppermost glabrous.—The stamens appear to agree with *Vatica*, and according to De Candolle are apiculate.

DOUBTFUL SPECIES.

V.? (Isauxis) cordifolia, *Thw. Enum.* 404 and 39 (*Monoporandra*). Foliage only known. *Leaves* 5–7½ by 2–4 in., oblong or ovate-lanceolate, acute, base obliquely cordate, lateral nerves about 7 pairs; petiole ½–¾ in.—Ceylon; Atakalan Corle, *Thwaites.*

5. **SHOREA,** Roxb.

Glabrous, mealy, or pubescent resinous trees. *Leaves* entire or subrepand, feather-veined, with the intermediate reticulations often inconspicuous; stipules large coriaceous and persistent, or minute and fugacious. *Flowers* in axillary or terminal lax cymose panicles; bracts persistent, caducous or 0. *Calyx-tube* very short, adnate to the receptacle; segments ovate or lanceolate, imbricate. *Stamens* 15 or 20–100; anthers ovate or oblong, rarely linear; connective subulate-cuspidate, rarely inappendiculate; valves obtuse, rarely cuspidate, equal or the outer slightly larger. *Ovary* 3-celled, cells 2-ovuled; style subulate, stigma entire or 3-toothed. *Capsule* leathery, indehiscent (or 2-valved?), usually 1-seeded, closely surrounded

by the bases of the accrescent calyx-segments 3 or more rarely all of which are developed into 10-veined linear wings. *Cotyledons* fleshy, unequal, usually inclosing the superior radicle. Distrib.—Tropical Asia and Indian Archipelago; species about 40.

Sect. I. **Pentacme,** *A. DC.* *Anthers* linear, valves cuspidate.

1. **S. siamensis,** *Miq. Ann. Mus. Bot.* i. 214; *A. DC. Prodr.* xvi. 2, 631. Pentacme suavis, *A. DC. l.c.* 626. P. siamensis, *Kurz in Journ. Asiat. Soc. Beng.* 1870; 2, 66. Hopea (Shorea?) suava, *Wall. Cat.* 959.

Martaban, *Wallich;* Tenasserim, at Moulmein, *Lobb;* Pegu, *Kurz.*—Distrib. Siam.

A shrub 10 ft., leafless during inflorescence; branchlets with smooth greyish bark. *Leaves* 5–6 by 3–4 in., oblong or ovate-oblong, obtuse or subacute, base truncate or cordate, glabrous above and beneath, lateral nerves 15 pairs, scarcely prominent; petiole 1–1½ in. *Panicles* 6–9 in., axillary and terminal, lax, branches divaricate; pedicels ⅓ in. *Flowers* sweet-scented. *Calyx-segments* ⅙ in., ovate, acute, glabrous, margins ciliolate. *Petals* $\frac{7}{12}$ in., pale citron-colour. *Stamens* 15, filaments very short; anthers ⅙ in. long, lobes slightly unequal, connective with a subulate prolongation, ultimately bent outwards. *Style* $\frac{5}{12}$ in., filiform. *Capsule* indehiscent, ovoid; pedicel dilated; bases of fruiting calyx-segments ovate, thickened, glabrous; wings 3 in., linear-oblanceolate, obtuse, 7-nerved.—Of *Hopea suavis*, Kurz, Andamans Report, I have only seen leaves. They do not belong to this species.

Sect. II. *Anthers* oblong, valves obtuse.

* *Stamens* 12–15.

2. **S. stellata,** *Dyer;* calyx-segments equally developed into wings or 2 slightly shorter. Parashorea stellata, *Kurz in Journ. Asiat. Soc. Beng.* 1870, 2, 66.

Martaban, *Brandis;* Birma, *Kurz.*

A large glabrous tree. *Leaves* 4½ by 1½ in., ovate or lanceolate, acute or apiculate. *Flowers* in panicles of cymose racemes, white. *Capsule* ¾ in. long, obovoid, tawny-tomentose; wings 4½ by ¾ in., linear-oblanceolate, obtuse, tapering to a very obscurely dilated base ⅙ in. long, strongly 7-nerved, puberulous.—The subequal accrescence of the sepals occurs also in *S. robusta*, and appears to me of no value as a generic distinction.

** *Stamens* 15.

† Flowers pedicelled.

3. **S. floribunda,** *Kurz, ms;* leaves rather narrowly-oblong shortly acuminate, panicles terminal or lateral from the axils of fallen leaves, flowers rather crowded, calyx-segments narrowly deltoid-ovate glabrous dark-coloured. S. robusta, *A. DC. Prodr.* xvi. 2, 628 (*not of Gærtn.*). Hopea floribunda, *Wall. Cat.* 964.

Tenasserim, at Tavoy, *Gomez.*

Glabrous; branchlets with pale brown bark. *Leaves* about 3½ by 1–1½ in., hardly mature at the time of flowering, base rounded; lateral nerves about 15–20 pairs; petiole ½–¾ in. *Pedicels* ½ in. *Flowers* rather larger than in *S. Talura.* *Calyx-segments* glabrous, ciliolate. *Anthers* with a very long seta.—Fruit unknown, but this and the next species are evidently closely allied. It has nothing to do with *S. robusta*, to which A. De Candolle can have referred it only through some confusion of specimens.

4. **S. Talura,** *Roxb. Hort. Beng.* 93; *Fl. Ind.* ii. 618; leaves elliptic or oblong to ovate-elliptic, panicles terminal or lateral from the axils of fallen

leaves lax, calyx segments deltoid linear glabrous not dark coloured. S. laccifera, *Heyne ex Wall. Cat.* 967; *A. DC. Prodr.* xvi. 2, 630. S. Roxburghii, *Don Gen. Syst.* i. 813. S. robusta, *Roth. nov. sp.* 221 (*not of Gœrtn.*). Vatica laccifera, *W. & A. Prodr.* 84; *Wight. Ic.* 164.

WESTERN PENINSULA; forests of Mysore and Malabar.

Glabrous, except the pubescent buds; branchlets with smooth pale brown bark. *Leaves* 3½–4½ by 2–2½ in., acute or retuse and mucronulate, base rounded or emarginate, margins undulate, lateral nerves about 12–15 pairs; petiole ½–1 in. *Pedicels* ½ in. *Flowers* 1 in. diam., pinkish white. *Calyx-segments* glabrous, margins ciliolate. *Anthers* with a long seta. *Bases of fruiting calyx-segments* ¾ in. long, obovate; wings 3 by ⅝ in., elliptic-linear, obtuse, with about 10 slender parallel nerves.—Yields a kind of lac.

†† Flowers sessile or nearly so.

5. **S. leprosula,** *Miq. Fl. Ned. Ind. Suppl.* i. 487; leaves oblong very shortly acuminate, panicles terminal or axillary, branches small unilateral racemose, calyx-segments ovate pubescent. *A. DC. Prodr.* xvi. 2, 631.

MALACCA, *Maingay.*—DISTRIB. Sumatra.

Young parts and under surface of the leaves densely tawny-puberulous. *Leaves* about 4–5 by 1¾–2¼ in., shining above, lateral nerves about 14 pairs, prominent beneath; petiole ½ in. *Panicle* about 4 in. *Flowers* sessile. *Anthers* cuspidate. (*Ovary* glabrous; style filiform, stigma urceolate. *Maingay.*) (*Fruit-wings* spathulate obtuse. *Miq.*)

6. **S. parvifolia,** *Dyer;* leaves oblong-elliptic to ovate-acuminate, panicles terminal lax, flowers with deciduous bracts, calyx-segments ovate pubescent.

MALACCA, *Maingay.*

Young parts hoary, puberulous. *Leaves* 2–2½ by 1–1½ in., base rounded, glabrescent beneath, lateral nerves about 15 pairs; petiole ⅓ in. *Panicles* about 5 in. *Flowers* sessile, 4 or 5 together; bracts fully ⅙ in. long, broadly elliptic, obtuse. (*Petals* ¼ in. long. *Anthers* apiculate. *Ovary* pilose; style slender, shorter than the ovary, stigma scarcely lobed. *Maingay.*) *Fruit* unknown.

7. **S. acuminata,** *Dyer;* leaves ovate to lanceolate strongly acuminate, panicles terminal lax, branches unilateral, bracts very fugacious, calyx-segments ovate pubescent.

MALACCA, *Maingay.*

Young parts tawny-puberulous. *Leaves* 4–5 by 2–2½ in., base rounded or emarginate, coriaceous, glabrous on both surfaces, lateral nerves about 8 pairs, scarcely prominent; petiole ½ in. *Panicles* about 6 in. long, with tufts of enlarged bracts occasionally terminating the branches. *Flowers* sessile. (*Petals* $\frac{3}{10}$ in. long. *Anthers* shortly appendiculate. *Ovary* minutely pilose, tapering into the short filiform style, stigma minutely lobed. *Maingay.*) *Fruit* unknown.

8. **S. bracteolata,** *Dyer;* leaves more or less narrowly oblong-elliptic shortly acuminate, panicles terminal lax, branches flexuose, flowers each with a pair of bracts, calyx-segments narrowly deltoid puberulous.

MALACCA, *Maingay.*

Young parts glabrescent. *Leaves* 3½–5¼ by 1½–2¼ in., base rounded, glabrous on both surfaces, lateral nerves 12–15 pairs, scarcely prominent; petiole ½–¾ in. *Panicles* 5–9 in. long. *Flowers* subsessile; bracts ⅓ in. long, elliptic-lanceolate. *Calyx segments* ⅛ in. long. *Stamens* cuspidate. *Stigma* simple. *Bases of fruiting calyx segments* ½ in long, ovate with 3 gibbosities at the bottom; wings 3½ by ½ in., linear subacute, with 9 parallel nerves.

* *Stamens* 20–∞.

9. **S. robusta,** *Gærtn. f. Fruct.* iii. 48, t. 186; leaves ovate-oblong acuminate base cordate glabrous lateral nerves about 12 pairs, panicles terminal or axillary lax, stamens 50. *Roxb. Fl. Ind.* ii. 615; *Cor. Pl.* iii. 312; *Wall. Cat.* 965; *A. DC. Prodr.* xvi. 2, 628; *Beddome Fl. Sylvat.* t. 4. Vatica robusta, *Steud. Nom. Ed.* 2.

Tropical Himalaya, and along its base from Assam to the Sutlej. Eastern districts of Central India, Western Bengal hills.

A very large tree, but often occurring in a stunted form. *Leaves* 6–10 by 4–6 in.; petiole ¾–1 in.; stipules ⅓ in., falcate, pubescent. *Panicles* 5–9 in. long, clothed as well as the flowers with pale velvety pubescence, branches unilateral, racemose. *Flowers* subsessile. *Petals* about ½ in. long, pale yellow, tapering upwards, 12–13-nerved. *Anthers* with a bearded appendage. *Ovary* pubescent; stigma 3-denticulate. *Fruiting-calyx* with the segments sometimes subequal, bases ⅓ in., ovate, pubescent; wings 2½ in., linear, obtuse, 10-nerved.—The Sal tree; the wood is very generally used in Bengal and it ranks next to teak; the resin-dammer is extensively used as a substitute for pitch.

10. **S. obtusa,** *Wall. Cat.* 966; leaves elliptic or obovate-oblong obtuse base obtuse or emarginate pubescent on the nerves and in their axils beneath lateral nerves about 15 pairs, panicles terminal, stamens 20–25. *Blume Mus. Bot.* ii. 32, t. 8; *A. DC. Prodr.* xvi. 2, 629. S. leucobotrya, *Miq. Ann. Mus. Bot.* i. 215. Vatica obtusa, *Steud. Nom. Ed.* 2.

Martaban, *Wallich*; Pegu, *M'Clelland*, &c.; Tenasserim, at Moulmein, *Helfer.*—Distrib. Siam.

Leaves 4–6 by 1½–3 in., often unsymmetrical, glabrescent above, subrepand; petiole ½–¾ in. *Panicles* 2–4 in. long, clothed as well as the flowers with hoary pubescence, racemose. *Flowers* subsessile. *Petals* ¼–⅓ in. long. *Anthers* with a bearded appendage. *Ovary* pubescent. *Bases of the segments of the fruiting-calyx* ⅓ in. long, rather shorter than the pubescent capsule, ovate-oblong, pubescent; wings 2½ by ½ in. linear-oblanceolate, glabrescent, 9-nerved.

11. **S. sericea,** *Dyer*; leaves elliptic-oblong shortly acuminate scabrous beneath lateral nerves about 20 pairs, panicles terminal, stamens 50, anthers inappendiculate.

Malacca, *Maingay.*

A very large dammer-producing tree (*Maingay*); young parts, nerves of the leaves beneath and inflorescence covered with rusty meal intermixed with fascicles of short hairs. *Leaves* 4½–7 by 1¾–2¾ in., polished above, lateral nerves very prominent beneath; petiole ⅓–¾ in. *Panicles* about 6 in. long, ultimate branches racemose, unilateral. *Flowers* sessile; buds clothed with tawny silky hairs. *Anthers* with the lobes subequal. *Stigma* 3-lobed. *Fruiting-calyx* with immature accrescent segments, clothed on both surfaces with soft yellow down.

12. **S. Tumbuggaia,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 617; leaves ovate or oblong-cordiform acuminate base truncate or emarginate glabrous on both surfaces lateral nerves about 8 pairs, panicles terminal, stamens about 30. *A. DC. Prodr.* xvi. 2, 630; *Beddome Flor. Sylvat. Gen.* 26. S. penicillata, *A. DC. l.c.* 630. Vatica Tumbuggaia, *W. & A. Prodr.* 84; *Wight Ic.* t. 27.

Western Peninsula; forests of Cudapah and Palghaut in Mysore, *Wight*, &c.

A gigantic dammer-producing tree. *Leaves* 2½–8 by 1½–4½ in. (*Beddome*); petiole 1–2 in. *Panicles* 8 in long, hoary or nearly glabrous. *Flowers* shortly pedicelled; buds densely hoary. *Anthers* with a hairy appendage. *Stigma* 3-lobulate. *Capsule* ¾ in. long, ovoid, acuminate, pubescent above; bases of fruiting calyx-segments ½ in. long, ovate, hoary; wings 1½–1¾ by ½ in., spathulate, obtuse, 8–10-nerved.—There can be no doubt as to the identity of this species. Roxburgh states the number of stamens to be 100, but this is clearly an error.

13. **S. oblongifolia,** *Thwaites Enum.* 36; leaves oblong shortly acuminate base truncate or emarginate both surfaces glabrous lateral nerves about 15 pairs, panicles terminal or axillary, stamens 80–100. *A. DC. Prodr.* xvi. 2, 629.

CEYLON; Southern districts of the Island, *Thwaites.*

A large tree. *Leaves* 4–6 by 1¾–2½ in.; petiole ½–¾ in. *Panicles* 6 in. long, racemose, hoary. *Flowers* yellow, odorous, shortly pedicelled; buds densely hoary. *Anthers* with a terminal bristle about their own length and two minute lateral ones. *Capsule* ¾ in. long, ovoid, silky-pubescent; bases of the fruiting calyx-segments ½ as long as the capsule, oblong, gibbous, puberulent; wings 2 by ¾ in., spathulate, obtuse.

14. **S. lissophylla,** *Thwaites Enum.* 402; leaves oblong-cordiform slightly acuminate base emarginate both surfaces glabrous lateral nerves about 7 pairs prominent beneath, panicles small terminal or axillary, stamens about 35. *A. DC. Prodr.* xvi. 2, 630.

CEYLON; Hinidoon Pattoo and Singhe-rajah Forest, *Thwaites.*

A large tree, twigs black when dry. *Leaves* 3–5 by 1½–3 in.; petiole ⅓–½ in., rugose. *Panicles* about 3 in. long, racemose, glabrous. *Flowers* shortly pedicelled; buds hoary. *Anthers* bearded. *Fruit* unknown.

15. **S. stipularis,** *Thwaites Enum.* 36; leaves oblong shortly acuminate or subobtuse base rounded coriaceous both surfaces glabrous midrib channelled above very prominent beneath lateral nerves about 15 pairs. *A. DC. Prodr.* xvi. 2, 631.

CEYLON; between Ratnapoora and Galle, *Thwaites.*

A large tree. *Leaves* 4–6 by 2–4 in.; stipules ½–1 by ⅓–⅔ in., ovate, suboblique, with numerous slender nerves, very persistent; petiole 1¼–1½ in. *Flowers* unknown. *Capsule* subconic, smooth; (winged calyx-segments 5–5½ by 1¼ in., 11–14-nerved, *Thwaites*).

16. **S. assamica,** *Dyer;* leaves broadly elliptic or elliptic-oblong very shortly acuminate base rounded both surfaces glabrous midrib channelled above lateral nerves about 17 pairs hispid beneath rather prominent above.

UPPER ASSAM; banks of the Duhing river, *G. Mann.*

Young twigs thinly pendulous. *Leaves* about 3½ by 1¾ in., shining above. *Flowers* unknown. *Capsule* ¾ in., ovoid, acuminate, glabrous; bases of the fruiting calyx-segments about ½ as long as the capsule, broadly ovate, gibbous; wings 4 by ¾ in., linear, subacute, about 12-nerved.

17. **S. gratissima,** *Dyer;* leaves elliptic acuminate base acute both surfaces glabrous margins undulate lateral nerves about 14 pairs inconspicuous, panicles terminal and axillary, stamens 20–25. Hopea gratissima, *Wall. Cat.* 960.

SINGAPORE, *Wallich.*

Branchlets slender. *Leaves* 2½–4 by 1¼–1½ in.; petiole ¾–1 in. *Panicles* 3–6 in., glabrous, black when dry. *Flower-buds* hoary; pedicels about 1/12 in. *Anthers* with a terminal seta.

18. **S. reticulata,** *Thwaites ms.;* leaves lanceolate with a long acuminate point base acute shining above glabrous beneath margins undulate lateral nerves about 10 pairs hardly prominent beneath.

CEYLON.

Twigs slender, pale. *Leaves* 3–4 by 1¾ in.; petiole ½ in., decurved. *Flowers* unknown. *Bases of the fruiting calyx-segments* lanceolate, gibbous, puberulous; wings 1½ by ¼ in., linear, obtuse, glabrous, 8-nerved.

19. **S. macroptera,** *Dyer;* leaves narrowly oblong acuminate base obtuse somewhat coriaceous shining above glabrous beneath lateral nerves about 10 pairs rather prominent beneath, panicles terminal.

MALACCA, *Maingay.*—DISTRIB. Borneo.

Twigs puberulous, dark-brown. *Leaves* 4–5 by 1¾ in., chocolate-coloured when dry; petiole ½ in., rugose. *Flowers* sessile. *Capsule* (immature) ⅓ in. long; bases of the fruiting calyx-segments equalling the capsule, ovate, bordered by the decurrent margins of the wing; wings 5–6 by ¾–1 in., linear, obtuse, 10-nerved, glabrescent.

DOUBTFUL SPECIES.

SHOREA LONGISPERMA, *Roxb. Hort. Beng.* 93; *Fl. Ind.* ii. 618. Parashorea longisperma, *Kurz in Journ. As. Soc. Beng.* 1870, ii. 66. Prince of Wales' Island. Without description.

6. **HOPEA,** Roxb.

Glabrous or hoary-tomentose resinous trees. *Leaves* quite entire, firm, inconspicuously feather-veined; stipules small, deciduous or inconspicuous. *Flowers* sessile or shortly pedicelled, ebracteate, in lax panicles of unilateral racemes. *Calyx-tube* very short, adnate to the receptacle, segments obtuse, imbricate. *Stamens* 15, or rarely 10, slightly connate; anthers ovate, connective subulate-cuspidate, valves obtuse equal. *Ovary* 3-celled, the cells 2-ovuled; style shortly cylindric or subulate. *Nut* 1-seeded, closely surrounded by the bases of the accrescent calyx-segments, 2 of which are developed into linear wings. *Embryo* as in *Shorea.*—DISTRIB. of *Shorea;* species about 35.—The separation of this genus from *Shorea* is somewhat artificial.

* Panicles palely tomentose.

1. **H. odorata,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 609; leaves ovate- or lanceolate-oblong acute or obtusely acuminate lateral nerves about 12 pairs rather weak their axils often glandular, anthers oblong appendage about the same length. *A. DC. Prodr.* xvi. 2, 632. H. faginea, *Hort. Calc. ex Herb. Lemann.* (*not of Wall.*). H. eglandulosa, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 611; *A. DC. Prodr.* xvi. 2, 634. H. decandra, *Buch. ex Wight Ill.* 88. H. Wightiana, *Miquel in Herb. Hohenack.* 320, (*not of Wall*).

RANGOON, PEGU, MARTABAN and TENASSERIM.

A large tree; branchlets dark brown, glabrous. *Leaves* 4–6 by 1½–2 in., base rounded often suboblique, margins undulate, firm, glabrous on both surfaces; petiole ¾ in. *Flowers* sweet-scented, buds about ⅛ in., very shortly pedicelled. *Calyx-segments* ovate, obtuse. *Petals* yellow. *Nut* ¼ in., ovoid, apiculate, glabrous; wings of fruiting calyx-segments linear, obtuse, tapering to an oblong base ⅕ in.

VAR. 1. *odorata proper*, Wall. Cat. 961 (sp.); panicle ½ as long as the leaves rather dense, wings of fruiting calyx-segments 1½ by ⅔–⅚ in., 7–9-nerved. *Roxb. Cor. Pl.* iii. t. 210; *Korth. Verh. Nat. Gesch. Bot.* 75, t. 7, f. 15–21.—Mergui, *Griffith.*

VAR. 2. *vasta*, Wall. Cat. 926 (sp.); leaves gradually tapering opaque above, panicles equalling the leaves rather lax, wings of fruiting calyx-segments 1¾ by ⅚–1⅙ in., 9–13-nerved.—Rangoon to Mergui.

2. **H. parviflora,** *Beddome Flor. Sylvat.* t. 7 (*by error* t. 6); *Gen.* xxvii. *in part; Ind. For. Rep.* 1863–4, *with plate;* leaves ovate or oblong acute lateral nerves about 10 pairs often forked their axils often glandular, tips of

petals dilated and crisped, anthers suborbicular, appendage about half as long again.

MALABAR and S. CANARA; ascending to 3500 ft., *Beddome.*
A large tree; branchlets reddish-brown, slightly glaucescent. *Leaves* about 3½ by 1½ in., firm, base acute or rounded, margins slightly undulate, glabrous on both surfaces, nerves pale beneath; petiole ⅓ in. *Flower-buds* about ⅛ in., tomentose, very shortly pedicelled, calyx-segments lanceolate, obtuse. *Fruit* unknown.

3. **H. longifolia,** *Dyer;* leaves linear-lanceolate obtuse lateral nerves about 10 pairs very oblique their axils often glandular, tips of petals crisped, anthers suborbicular appendage about half as long again. H. parviflora, *Beddome Flor. Sylvat. Gen.* xxvii., *in part.*

SOUTH CARNATIC, near Tinnivelly, *Beddome.*
A large tree; branchlets brown. *Leaves* 5–7 by 1–1½ in., firm, base acute, margins slightly undulate, glabrous on both surfaces; petiole ⅝ in. *Flower-buds* 1/12 in., tomentose, shortly pedicelled. *Calyx-segments* ovate, acute. *Fruit* unknown.

** Panicles glabrous (except sometimes in *H. micrantha*).

4. **H. Wightiana,** *Wall. Cat.* 6295; branchlets pale softly pubescent at length glabrous, leaves oblong-lanceolate obtuse or acute lateral nerves about 10 pairs, panicles racemose axillary 1–6 together shorter than the leaves, calyx-segments glabrous. *W. & A. Prodr.* 85; *Wight Ill.* t. 37; *A. DC. Prodr.* xvi. 2, 633.

WESTERN PENINSULA, *Wight;* Concan, *Stocks.*
Leaves 5–8 by 1¾–3 in., firm, base acute rounded or emarginate, glabrous on both surfaces, opaque above, nerves oblique, curved, rather prominent above; petiole ½ in., stout, pubescent. *Bracts* 1/12 in., lanceolate, acute. *Buds* about ¼ in., very shortly pedicelled. *Calyx-segments* lanceolate, obtuse. *Petals* pubescent externally. *Anthers* with an appendage 4 times their length. *Nut* ½ in., ovoid, apiculate, glabrous; bases of fruiting calyx-segments scarcely distinct, gibbous, wings 1¾–2½ by ½–¾ in., linear or elliptic-linear obtuse, about 9-nerved, usually tinged with red.—The inflorescence is often diseased and condensed into a globular mass; this is *Artocarpus lanceæfolia,* Roxb. Fl. Ind. iii. 527, ex Miquel, in Herb. Hohenack. 796 *a.*

5. **H. glabra,** *W. & A. Prodr.* 85; branchlets dark-coloured glabrous, leaves lanceolate obtuse or shortly acuminate lateral nerves about 8 pairs, panicles 1–3 together, racemes axillary about equalling the leaves, calyx-segments glabrous.

WESTERN PENINSULA, *Wight;* Southern Carnatic, at Tinnivelly, *Beddome.*
Leaves about 4 by 1½ in., base acute or obtuse, glabrous and rather shining on both surfaces, nerves oblique curved and prolonged parallel to the margins slightly prominent above; petiole ½ in., rugose. *Bracts* nearly ⅙ in., lanceolate, obtuse. *Flower-buds* very shortly pedicelled. *Calyx-segments* ovate, obtuse. *Petals* pubescent. *Anthers* orbicular, appendage about 3 times as long. *Fruit* unknown.

6. **H. oblongifolia**, *Dyer;* branchlets pale compressed, leaves oblong shortly acuminate lateral nerves about 10 pairs, panicles racemose axillary (rarely two together) about half as long as the leaves, calyx-segments glabrescent.

TENASSERIM; at Mergui, *Griffith.*
Leaves about 7 by 2½ in., firm, base obtuse, glabrous and rather opaque on both surfaces; nerves oblique, scarcely curved, inconspicuous above; petiole ½ in., glabrous. *Bracts* minute, about equalling the very short pedicels. *Calyx-segments* ovate, acute. *Petals* pubescent. *Anthers* orbicular with an appendage 4 times their length. *Fruit* unknown.

7. **H. Griffithii,** *Kurz ms.;* branchlets slightly lepidote at length glabrous, leaves lanceolate caudate-acuminate obtuse lateral nerves about 10 pairs evanescent, panicles axillary less than half the length of the leaves, calyx-segments glabrous.

TENASSERIM; Mergui, *Griffith.*

Branches dark-barked, with pale striæ. *Leaves* 3–4 by 1–$1\frac{1}{4}$ in., firm, base acute, glabrous on both surfaces, midrib prominent below; petiole $\frac{1}{2}$ in., slender. *Bracts* minute, shorter than the pedicels, lanceolate, acute. *Flower-buds* $\frac{1}{10}$ in., shortly pedicelled. *Petals* palely pubescent. *Anthers* suborbicular, appendage about twice as long. *Fruit* unknown.

8. **H. micrantha,** *Hook. f. in Trans. Linn. Soc.* xxiii. 160; branchlets dark-coloured minutely lepidote, leaves elliptic-ovate or lanceolate caudate-acuminate obtuse lateral nerves very numerous evanescent, panicles terminal or axillary less than $\frac{1}{2}$ the length of the leaves hoary-pubescent, calyx-segments varnished. *A. DC. Prodr.* xvi. 2, 634.

MALACCA, *Maingay.*—DISTRIB. Borneo.

A very lofty tree. *Leaves* 2–$2\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{4}$ in., coriaceous, glabrous on both surfaces, midrib prominent above and beneath; petiole $\frac{1}{2}$ in., puberulent. *Flowers* $\frac{1}{10}$ in., pedicels fully $\frac{1}{12}$ in. *Petals* palely pubescent. *Anthers* suborbicular, appendage about as long. *Nut* conical; bases of fruiting calyx-segments $\frac{1}{4}$ in. long with two gibbosities at the bottom, wings $1\frac{1}{2}$ in. oblanceolate, obtuse, 9-nerved.

9. **H. discolor,** *Thwaites Enum.* 36; branchlets dark-coloured slightly pruinose, leaves lanceolate caudate-acuminate obtuse reddish-brown beneath lateral nerves about 5 pairs depressed above, panicles axillary sometimes 2–3 together about $\frac{1}{3}$ the length of the leaves, calyx-segments glabrous. *A. DC. Prodr.* xvi. 2, 633.

CEYLON; Saffragam and Ambagamowa districts, at no great elevation, *Thwaites.*

A large tree. *Leaves* 2–3 by $\frac{3}{4}$–1 in.; petiole $\frac{1}{2}$ in. *Panicle* bright red; pedicels $\frac{1}{12}$ in. *Petals* yellow, palely puberulous. *Anthers* suborbicular, appendages three times their length. *Nut* $\frac{5}{8}$ in., conical, acute, glabrous; bases of fruiting calyx-segments $\frac{1}{4}$ in. lanceolate; wings $1\frac{1}{2}$–3 by $\frac{1}{3}$–$\frac{3}{4}$ in.; oblanceolate, obtuse, 7-nerved.

10. **H. racophlœa,** *Dyer;* branchlets brown, leaves ovate shortly caudate-acuminate base acute lateral nerves about 4 pairs oblique curved about equally prominent on both surfaces with large axillary glands, panicles terminal or axillary exceeding the leaves.

MALABAR; Wynaad forests, alt. 2–3000 ft., *Beddome.*

A large tree, the bark peeling off in adherent scales (*Beddome*). *Leaves* 4–$4\frac{1}{2}$ by 2–$2\frac{1}{2}$ in., firm, glabrous on both surfaces; petiole $\frac{5}{8}$ in. slender. *Bases of fruiting calyx-segments* minute, scarcely distinct, thickened, gibbous; wings 3 by 1 in., oblong, tip truncate or rounded inconspicuously 10-nerved, reddish.—Nearly allied to the Ceylon *H. jucunda.*

11. **H. jucunda,** *Thwaites Enum.* 403; branchlets dark purplish-brown, leaves ovate or orbicular abruptly acuminate obtuse base rounded or obtuse lateral nerves about 4 pairs oblique curved slightly depressed above with large axillary glands, panicles terminal or axillary. *A. DC. Prodr.* xvi. 2, 633.

CEYLON; Hinidoon Pattoo, Pasdoon Corle, and Saffragam district, *Thwaites.*

A large tree. *Leaves* $1\frac{1}{2}$–5 by 1–$2\frac{1}{2}$ in., firm, glabrous on both surfaces; petiole $\frac{1}{2}$ in. transversely rugose. *Flower-buds* $\frac{1}{6}$ in.; pedicels $\frac{1}{12}$ in. *Calyx-segments* ovate, varnished. *Petals* palely-pubescent externally. *Anthers* with an appendage four times their length. *Fruit* unknown.

VAR. *modesta,* DC. Prodr. xvi. 2, 633; leaves 1–2 in., branches of the panicle filiform.

7. DOONA, Thwaites.

Lofty glabrous and often glaucescent resinous trees, with the habit of (except in *H. nervosa*) some species of *Hopea*. *Leaves* entire, firm, inconspicuously veined; stipules small, deciduous or inconspicuous. *Flowers* rather small, usually in lax panicles rarely exceeding the leaves. *Calyx* as in *Hopea*. *Stamens* 15; anthers oblong, connective prolonged into a usually clavate appendage, valves equal. *Ovary* as in *Hopea*. *Nut* 1-seeded. *Seed* ovoid with the thin testa interposed between the folds of the cotyledons; radicle superior.—DISTRIB. Endemic in Ceylon. Species 10.

1. **D. zeylanica,** *Thwaites in Hook. Journ.* iii. (1851) t. 12 and iv. 7; *Enum.* 34; leaves lanceolate caudate-acuminate base deltoid lateral nerves numerous ascending inconspicuous, pedicels exceeding the calyx. *Beddome Flor. Sylvat.* t. 97; *A. DC. Prodr.* xvi. 2, 626.

CEYLON; Central province, ascending to 4000 ft.

A tree of 60 ft. or more; branchlets much divided, somewhat flexuose, with smooth purple-brown bark. *Leaves* 2–3 by ¾–1 in., midrib prominent beneath, channelled above; petiole ½ in. *Panicles* 2 in., erect, many-flowered; bracts small, brown, deciduous. *Flowers* ⅖ in. diam., pink; pedicels ⅓ in., erect. *Outermost calyx-segments* deltoid-ovate, obtuse. *Anthers* with an appendage about ½ as long, glabrous, varnished. *Nut* (immature) ⅓ in. long, ovoid; winged fruiting calyx-segments about 1 in. oblanceolate with an ovate base, at first bright red.—Yields a gum resin manufactured into a varnish.

2. **D. nervosa,** *Thwaites Enum.* 35; leaves oblong elliptic or ovate caudate-acuminate base rounded lateral nerves prominent beneath ascending, pedicels about equalling the calyx. *A. DC. Prodr.* xvi. 2, 627.

CEYLON; Ekualagodde near Ratnapoora, *Thwaites.*

A large tree; branchlets dichotomously divided with rather pale brown bark transversely rugose on the ultimate twigs when dry. *Leaves* 3½–4½ by 1½–2 in., lateral nerves about 9 pairs; petiole ½ in. *Panicle* 2 in., racemose, 3–6-flowered. *Flowers* ⅝ in. diam.; pedicels ⅕ in. decurved, then erect. *Outermost calyx-segments* oblong, obtuse, glabrous, scarcely varnished. *Winged fruiting calyx-segments* 1–1½ in., oblong or oblanceolate, tip rounded, base narrow, gibbous.

3. **D. affinis,** *Thwaites Enum.* 35; leaves oblong caudate-acuminate base rounded lateral nerves inconspicuous ascending, pedicels about equalling the calyx. *A. DC. Prodr.* xvi. 2, 627.

CEYLON; between Ratnapoora and Galle, at no great elevation, *Thwaites.*

Branchlets dichotomously divided, brown barked. *Leaves* 2–3 by 1–1¼ in., lateral nerves about 6 pairs, midrib channelled above; petiole ½ in. *Panicle* 1½–2 in., peduncled, subcorymbose, 6–9-flowered; pedicels ⅛ in., at first decurved. *Outermost calyx-segments* oblong, obtuse, glabrous, scarcely varnished. *Fruit* unknown.—This description does not completely agree with that of Thwaites; it is drawn up from specimens distributed as *D. nervosa* β C.P. 3712 and referred subsequently (*Enum.* 402) to this species.

4. **D. trapezifolia,** *Thwaites Enum.* 35; leaves rhomboid-lanceolate gradually caudate-acuminate base obtuse lateral nerves inconspicuous spreading, pedicels exceeding the calyx. *A. DC. Prodr.* xvi. 2, 627.

CEYLON; Central and Southern provinces; common, ascending to 1500 ft., *Thwaites*, &c.

A large tree; branchlets much divided, bark brown with minute pale warts. *Leaves* 2½–3½ by 1–1¼ in., opaque, midrib slightly channelled above, lateral nerves about 12; petiole ½ in. *Panicle* about 1½ in., racemose, about 6-flowered. *Flowers* ½ in. diam.; pedicels ¼ in. erect. *Outermost calyx-segments* oblong-lanceolate, obtuse. *Nut* ¾ in.

long; winged fruiting calyx-segments 2 in., linear-lanceolate, obtuse, glaucous, base shorter than the nut, ovate.

5. **D. congestiflora,** *Thwaites Enum.* 35; leaves ovate-lanceolate gradually acuminate base rounded, flowers very shortly pedicelled in dense peduncled panicles. *A. DC. Prodr.* xvi. 2, 627.

CEYLON; Hinidoon and Pasdoon Corles, *Thwaites.*

A large tree; branchlets with pale minutely warted bark. *Leaves* 3–4½ by 1½–2 in., firm, midrib slightly channelled above, prominent beneath, lateral nerves about 9 pairs, scarcely conspicuous, ascending, curved. *Peduncle* 1 in. *Flowers* ½ in. diam., pink; pedicels $\frac{1}{12}$ in. or less. *Outermost calyx-segments* oblong, obtuse, opaque. *Petals* scarcely puberulous, margins ciliolate. *Nut* ¾ in.; winged fruiting calyx-segments 2 in., linear-oblanceolate, obtuse.

6. **D. Gardneri,** *Thwaites Enum.* 35; leaves long-petioled ovate acuminate base rounded, pedicels shorter than the calyx deflexed. *Beddome Flor. Sylvat.* t. 98; *A. DC. Prodr.* xvi. 2, 628.

CEYLON; Central province between 3–5000 ft., *Walker*, &c.

A large tree; branchlets much divided, slightly flexuose, with smooth purplish brown bark. *Leaves* 2–3¼ by 1¼–1¾ in., lateral nerves about 10 pairs, ascending, inconspicuous, midrib channelled above, prominent beneath; petiole ¾–1 in. *Panicle* 2½–4 in. racemose. *Flowers* ¾ in. diam., pinkish; pedicels ⅛ in. *Outermost calyx-segments* deltoid-oblong, obtuse, shining. *Winged fruiting calyx-segments* 1½ in., linear-oblanceolate obtuse; base dilated gibbous, equalling the immature nut.

7. **D. cordifolia,** *Thwaites Enum.* 35; leaves ovate-lanceolate or oblong shortly caudate-acuminate rounded or cordate at the base, midrib elevated above, lateral nerves prominent beneath. *A. DC. Prodr.* xvi. 2, 628.

CEYLON; Pasdoon Corle and Ambagamowa, at no great elevation, *Thwaites.*

A large tree; branchlets much divided, flexuose, with dark-coloured bark. *Leaves* 4–6 by 1½–2¼ in., lateral nerves about 10 pairs, ascending, curved; petiole ⅓ in., transversely rugose. *Flowers* unknown.—The terminal buds appear to be frequently converted into a curious strobiliform gall resulting from the production of a multitude of small imperfectly developed leaves.

8. **D. macrophylla,** *Thwaites Enum.* 402; leaves large oblong obtusely acuminate base rounded, pedicels about equalling the calyx. *A. DC. Prodr.* xvi. 2, 627.

CEYLON; Hinidoon Pattoo, *Thwaites.*

A large tree; branchlets with pale brown striately rugose bark. *Leaves* 6½–8 by 2½–3 in., pale beneath; midrib channelled above, prominent beneath, lateral nerves about 15 pairs, parallel. *Panicle* 4–7 in., racemose. *Pedicels* ¼ in., deflexed. *Calyx-segments* elliptic, glabrous. *Petals* ⅓ in., elliptic, canescent externally. *Anthers* ⅙ in. long, appendage about $\frac{1}{25}$ in. *Fruit* unknown.

9. **D. ovalifolia,** *Thwaites Enum.* 402; leaves ovate obtusely caudate-acuminate base rounded lateral nerves inconspicuous above prominent beneath ascending, pedicels equalling the calyx. *A. DC. Prodr.* xvi. 2, 628.

CEYLON; Saffragam district, *Thwaites.*

A large tree; branchlets dichotomously divided, somewhat flexuose, with dark brown bark. *Leaves* 1½–2½ by ¾–1¼ in.; lateral nerves about 8 pairs; petiole ¼ in. *Panicles* racemose, axillary or terminal, few-flowered, shorter than or equal to the leaves. *Pedicels* deflexed.

10. **D. venulosa,** *Thwaites Enum.* 402; leaves oblong or ovate-oblong obtusely abruptly acuminate with close and prominent venation above. *A. DC. Prodr.* xvi. 2, 628.

CEYLON; south of the Island, *Thwaites.*

A large tree; branchlets turning black when dry. *Leaves* 2–3 by 1–1½ in.; lateral nerves about 7 pairs; petiole ¼–¾ in.—I have taken these particulars from Thwaites as I have seen no specimens.

8. VATERIA, Linn.

Glabrous tomentose or furfuraceous resinous trees. *Leaves* entire, firm or leathery, feather-veined; stipules deciduous or inconspicuous, rarely large and persistent. *Flowers* in terminal lax corymbose or lateral racemose panicles, or 1–3 on axillary peduncles. *Calyx* as in *Shorea. Stamens* 15, rarely about 50; anthers linear or oblong, connective rarely prolonged or minutely apiculate, external valves equal, or longer, or longer and broader and rolled inwards at the apex. *Ovary* as in *Shorea. Capsule* ovoid or globose, leathery or fleshy, 1-seeded, indehiscent, or 3-valved, supported by the reflexed scarcely accrescent calyx. *Cotyledons* large, fleshy, unequal, usually lobed, inclosing the superior radicle.—DISTRIB. of *Shorea*; species about 17.—A. De Candolle transfers the section *Stemonoporus*, which is endemic in Ceylon, to *Vatica.* The species, however, have an imbricate calyx which in fruit completely agrees with that of *Vateria.*

SECT. I. **Pœnoe.** *A. DC. Stamens* about 50; anther-cells adnate to the apex of the acuminate connective, external valves much the longer.

1. **V. indica,** *L.*; *Roxb. Fl. Ind.* ii. 602; *Cor. Pl.* iii. t. 288; *W. & A. Prodr.* 84; *Wight Ill.* i. 88, t. 36; *Wall. Cat.* 3670; *Gærtn. f. Fruct.* iii. 29, t. 4. V. malabarica, *Blume Mus. Bot.* ii. 29; *A. DC. Prodr.* xvi. 2, 624; *Beddome Fl. Sylvat.* t. 84.—*Rheede Hort. Mal.* iv. t. 15.

WESTERN PENINSULA; from Canara to Travancor, *Wight*, &c.

A large tree; young branchlets and inflorescence stellately canescent. *Leaves* 5–8 by 2½–3½ in., oblong or elliptic-oblong, obtuse or minutely acuminate, base rounded or emarginate, lateral nerves 14 pairs, slender; petiole 1½ in.; stipules ⅛ in., obliquely lanceolate, acute. *Panicle* 6–8 in., terminal, loosely corymbose, branches spreading. *Flowers* ¾ in. diam., 1-ranked, erect; pedicels ½ in. *Calyx-segments* lanceolate, obtuse, canescent on both surfaces. *Petals* elliptic-oblong, obtuse, white. *Anthers* glabrous. (*Capsule* 2½ by 1½ in., oblong, obtuse, coriaceous, fleshy, 3-valved. *Roxb.*)—Linnæus clearly intended his name *Vateria indica* to apply to Rheede's plant. He identified with this an imperfect specimen in the 4th volume of Hermann's Herbarium now in the British Museum. What appears to be this specimen is perhaps indeterminable, but certainly does not belong to *Dipterocarpeæ.* The evidence appears to show that *V. acuminata*, Hayne, was unknown to Linnæus, and has therefore no claims to be identified with *V. indica.*

SECT. II. **Hemiphractum.** *Turcz. Stamens* about 50; anther-cells distinct at the apex, acuminate, valves equal, connective not prolonged.

2. **V. acuminata,** *Hayne Arzn.* xi. 5; *A. DC. Prodr.* xvi. 2 (*not of Thw.*). V. indica, *Thwaites Enum.* 37; *Beddome Flor. Sylvat.* t. 84; *Blume Mus. Bot.* ii. 29, t. 4 (*not of L.*). Elæocarpus copalliferus, *Retz. Obs.* iv. 27. Hemiphractum oxyandrum, *Turcz. in Bull. Soc. Mosc.* 1859, i. 262.

CEYLON; common in the hotter parts of the Island, ascending to 2000 ft., *Thwaites.*

A large handsome tree; young branches and inflorescence densely covered with short caducous ferruginous hairs. *Leaves* 6–8 by 3 in., elliptic or oblong-lanceolate, shortly acuminate, base rounded, lateral nerves about 20 pairs, stout; petiole 1½ in.; stipules ¾–1 in., linear-deltoid, attenuate. *Panicle* terminal, 8 in., loosely corymbose; bracteoles ⅓ in., ovate, obtuse. *Flowers* 1 in. diam., 1-ranked, erect; pedicels ½ in. *Calyx* ferruginous without, canescent within. *Petals* orbicular, acute, white. *Anthers* puberulous. (*Fruit* 4 in. long by 2½–3 in. broad.—Yields a green resin, used in Cingalese superstitious ceremonies. *Thwaites.*)

SECT. III. **Stemonoporus,** *Thwaites.* *Stamens* 15; anthers with the external valves longer, broader and rolled inwards at the apex.

* *Inflorescence panicled.*

3. **V. ceylanica,** *Wight Ill.* i. 88; leaves elliptic or oblong apiculate or retuse base rounded or slightly acute. V. Wightii, *Thwaites Enum.* 403. Vatica Wightii, *A. DC. Prodr.* xvi. 2, 620. Stemonoporus Wightii, *Thwaites Enum.* 37.

CEYLON; forests between Galle and Ratnapoora, and near Palmadoolla, *Thwaites.*

A large tree; young branches glabrous. *Leaves* 5–11 by 3–5½ in., both surfaces pale, glabrous; lateral nerves 21 pairs, spreading; petiole 2½ in. *Panicles* 3 in. long, lateral. *Flowers* fully 1 in. diam. *Calyx* glabrescent. *Petals* elliptic, obtuse, sulphur-yellow. *Stamens* with dilated slightly connate filaments; anthers puberulous, connective with a short acute apex. *Style* subulate, acute.—I believe this to be the plant intended by Wight. The only sheet in his herbarium with this name has clearly been ticketed in error; it bears the inflorescence of *V. acuminata* and the foliage of some indeterminate plant.

4. **V. Gardneri,** *Thwaites Enum.* 403; leaves ovate or ovate-oblong, acuminate base rounded or cordate. Vatica Gardneri, *A. DC. Prodr.* xvi. 2, 622. Stemonoporus Gardneri, *Thwaites in Hook. Journ. of Bot.* 1854, 68, *t.* 2 A.

CEYLON; Rambodde, *Gardner;* Adams Peak, *Thwaites.*

A large tree; young parts faintly puberulous. *Leaves* 3–5 by 2–2½ in., lateral nerves about 10 pairs, ascending; petiole about ¾ in. *Panicles* about 2 in. long, numerous, collected towards the ends of the branches, 5–7-flowered. *Flowers* ¾ in. diam.; pedicels ¼ in., decurved. *Calyx-segments* glabrous, ovate, acute. *Petals* broadly ovate, white. *Stamens* connate at the base; external valves of the anthers rolled inwards at the apex, connective not prolonged. *Style* acute. *Fruit* globose, 1 in. diam.

5. **V. jucunda,** *Thwaites ms.;* leaves lanceolate or linear-lanceolate gradually acuminate base rounded. V. acuminata, *Thwaites Enum.* 403. (*not of Hayne*). Vatica acuminata, *A. DC. Prodr.* xvi. 2, 622.

CEYLON; Madamahanewera, Ambagamowa, and Badalla districts, *Thwaites.*

A large tree; young branches reddish-brown, glabrous. *Leaves* 4–7 by ¾–2 in., midrib very stout, lateral nerves about 12 pairs, ascending. *Panicles* 2½ in. long, lateral, racemose, puberulous. *Flowers* ¾ in. diam. *Calyx-segments* lanceolate, acute. *Petals* lanceolate, acute, pale yellow. *Stamens* and style as in *V. Gardneri.*—Mature fruit unknown.

** *Peduncles few-flowered.*

6. **V. affinis,** *Thwaites Enum.* 403; leaves ovate-oblong caudate-acuminate base rounded lateral nerves depressed when dry. Stemonoporus affinis, *Thwaites in Hook. Journ. Bot.* 1854, 68; *Enum.* 38. Vatica Thwaitesii, *A. DC. Prodr.* xvi. 2, 621.

CEYLON; Hunasgiria district, alt. 4000 ft., *Thwaites.*

A large tree. *Leaves* 3–4½ by 1¼–2 in., glabrous, opaque, glaucescent above, scabrid beneath; lateral nerves about 10 pairs, intervening spaces irregularly bullate when dry; petiole ¾ in., slender. *Peduncles* ⅓ in., axillary, usually 1-flowered. *Calyx-segments* subacute, hoary externally.

7. **V. lanceolata,** *Thwaites Enum.* 403; leaves elliptic-oblong shortly caudate-acuminate base acute midrib slightly prominent above lateral and transverse nerves depressed when dry. Stemonoporus lanceolatus, *Thwaites Enum.* 38. Vatica lanceolata, *A. DC. Prodr.* xvi. 2, 621.

Ceylon; near Ratnapoora, *Thwaites.*

A small tree; young parts glabrescent. *Leaves* 5½–7½ by 2–3 in., glabrous above, glabrescent beneath, lateral nerves about 8 pairs, prominent beneath; petiole ¾–1 in., stout, channelled. *Peduncles* ¼ in., slightly supra-axillary, 1-flowered. *Petals* ¼ in. long, elliptic, obtuse, pale yellow. *Calyx-segments in fruit* linear, acute.

8. **V. canaliculata,** *Thwaites Enum.* 403; leaves elliptic-oblong obtusely acuminate base obtuse or acute midrib channelled above lateral nerves in shallow depressions when dry with intramarginal connecting loops. Stemonoporus canaliculatus, *Thwaites Enum.* 38. Vatica canaliculata, *A. DC. Prodr.* xvi. 2, 621.

Ceylon; Hinidoon and Reigam Corles, *Thwaites.*

A moderate-sized tree; young parts and petioles striate, scabrous. *Leaves* 2½–4½ by 1¼–1¾ in., glabrous and opaque above, scabrous beneath, lateral nerves about 10 pairs, prominent beneath; petiole 1–1¼ in., thickened at the apex. *Peduncles* $\frac{1}{12}$ in., axillary, about 3-flowered. *Calyx-segments* oblong, obtuse, densely pubescent externally, buff-coloured. *Anthers* linear-lanceolate, minutely apiculate, puberulous. *Fruit* 1–1¼ in. diam., ½ in. deep, flattened-spheroidal, pale chocolate-coloured, mottled.

9. **V. petiolaris,** *Thwaites Enum.* 403; leaves oblong or elliptic-oblong shortly acuminate base rounded or subacute midrib elevated above, lateral nerves weak, petiole 1½–3 in. Stemonoporus petiolaris, *Thwaites Enum.* 38. Vatica petiolaris, *A. DC. Prodr.* xvi. 2, 621.

Ceylon; at Kittool Galle, *Thwaites.*

A moderate-sized tree; young parts and petioles scarcely scabrous. *Leaves* 6–10 by 2–2¾ in., glabrous above, scabrous beneath, lateral nerves about 12 pairs. *Peduncles* ¼ in., axillary, 1–3-flowered. *Calyx-segments* ovate-oblong, obtuse. *Anthers* lanceolate, minutely apiculate, puberulous.

10. **V. rigida,** *Thwaites Enum.* 403; leaves obovate emarginate base acute or narrowly elliptic obtuse base rounded midrib slightly elevated above very stout beneath lateral nerves depressed when dry. Stemonoporus rigidus, *Thwaites Enum.* 38. Vatica rigida, *A. DC. Prodr.* xvi. 2, 621.

Ceylon; Ambagamowa district, alt. about 3000 ft., *Thwaites.*

A large tree; young parts petioles and under-surface of the leaves minutely scabrous. *Leaves* 3½–5½ by 1¾ in., glabrescent and opaque above; lateral nerves about 10; petiole ½–¾ in. *Peduncles* very short, axillary, about 3-flowered. *Flowers* ¾ in. diam. *Calyx-segments* oblong, obtuse. *Petals* elliptic, subacute. *Anthers* linear-lanceolate, with a broad retuse apex, minutely hairy puberulous.

11. **V. oblongifolia,** *Thwaites Enum.* 403; leaves elliptic-oblong subacuminate base rounded midrib and lateral nerves slightly elevated above. Stemonoporus oblongifolius, *Thwaites Enum.* 38. Vatica oblonga, *A. DC. Prodr.* xvi. 2, 621.

Ceylon; Ambagamowa district, alt. about 4000 ft., *Thwaites.*

A large tree; young parts tawny pulverulent-scabrous. *Leaves* 3–5 by 1¾–2½ in., glabrous on both surfaces, midrib stout and prominent beneath; petiole ¾ in. *Peduncles* about ⅓ in., 1–4-flowered, crowded at the ends of the lateral shoots. *Calyx-segments* elliptic, subacute. *Petals* obovate, obtuse. *Anthers* linear-oblong, obtusely apiculate, puberulous. *Fruit* ½ in. diam., globose, 3-sulcate, pale brown, minutely wrinkled.

12. **V. reticulata,** *Thwaites Enum.* 403 ; leaves ovate or ovate-oblong leathery acuminate base rounded shining above lateral nerves inconspicuous. Stemonoporus reticulatus, *Thwaites Enum.* 38. Vatica reticulata, *A. DC. Prodr.* xvi. 2, 620.

CEYLON ; Hinidoon Corle, alt. about 1000 ft., *Thwaites.*

A moderate-sized tree ; young parts pulverulent. *Leaves* 2½–3½ by 1¼–2¼ in., opaque, midrib prominent and minutely reticulate beneath, lateral nerves 9 pairs ; petiole 1¼ in. *Peduncles* axillary, 1–2-flowered. *Flowers* ¾ in. diam. *Calyx-segments* lanceolate, glabrous, acute. *Petals* broadly elliptic, acute. *Anthers* linear, minutely apiculate, hairy-pubescent. *Fruit* 1¼ in. long, ovoid, acute, 3-sulcate, brown, minutely verrucose.

13. **V. nitida,** *Thwaites Enum.* 403 ; leaves lanceolate or ovate caudate-acuminate base rounded shining above opaque beneath midrib and lateral nerves inconspicuously prominent above. Stemonoporus nitidus, *Thwaites Enum.* 39. Vatica nitida, *A. DC. Prodr.* xvi. 2, 622.

CEYLON ; Pasdoon Corle, *Thwaites.*

A moderate-sized tree ; twigs white-barked, with black verruculæ, young parts dark brown, glabrescent. *Leaves* 3–4 by 1¼–1½ in., midrib prominent beneath, lateral nerves 6 pairs, slender ; petiole ⅓ in. *Peduncles* few-flowered. *Calyx-segments* lanceolate, acute. *Petals* elliptic, acute, yellowish. *Anthers* linear, minutely apiculate, puberulous.—The number of stamens proves this not to belong to *Monoporandra,* as A. De Candolle appears to think probable, no doubt from its resemblance to *M. lancifolia,* which appears to be nothing more than a variety.

VAR. *lancifolia,* Thwaites Enum. 404 (sp.) ; leaves 2½–3¼ by ¾–1 in., tapering-acuminate, fruit about 1 by ¾ in. ovoid pale brown minutely mottled. Monoporanda lancifolia, *Thwaites Enum.* 39 ; *A. DC. Prod.* xvi. 2, 637.—Hellessee and Pasdoon Corle, *Thwaites.* —The 15 stamens prove this to belong to *Vateria.*

14. **V. Moonii,** *Thwaites Enum.* 403 ; leaves linear-lanceolate base tapering nerves hairy on both surfaces when young ultimately glabrous. Stemonoporus ? Moonii, *Thwaites Enum.* 39. Vatica Moonii, *A. DC. Prodr.* xvi. 2, 622.

CEYLON ; Maturatte ? *Moon.*

Young parts and petioles densely fulvous-tomentose, ultimately glabrescent or pulverulous. *Leaves* 6–10 by 1–2 in., papery, midrib prominent beneath, lateral nerves about 20 pairs, curved upwards, rather slender, with weaker ones intervening ; petiole 1 in. *Stipules* ¾–1 in. distinct, linear-lanceolate, rigid, persistent. *Peduncles* 1-flowered, in the axils of fallen leaves.—Somewhat resembling *Vatica scabriuscula* in habit, but differing from other species of *Vateria.* Thwaites, however, by an analysis of the flower, has determined it to belong to *Stemonoporus.*

9. **MONOPORANDRA,** Thwaites.

Glabrescent or puberulous, much branched, moderate-sized trees. *Leaves* entire, firm, feather-veined ; stipules small, deciduous or inconspicuous. *Flowers* moderate-sized on small, few or many flowered axillary peduncles. *Calyx* as in *Vateria.* *Stamens* 5 ; anthers as in *Vateria* § *Stemonoporus,* minutely apiculate. *Ovary* 2-celled, cells 2-ovuled. *Fruit* globose, leathery, indehiscent, 1-seeded, supported by the reflexed scarcely accrescent calyx. *Cotyledons* fleshy, unequal, radicle superior.—DISTRIB. Endemic in Ceylon ; species 2. According to Bentham and Hooker, and also Baillon, *Monopo-*

randra does not differ from the *Stemonoporus* section of *Vateria* (with which genus Thwaites now unites it) except in the number of stamens. Thwaites however figured and described the ovary as 2-celled, and from the examination of *M. cordifolia* I find this to be correct.

1. **M. cordifolia,** *Thwaites in Hook. Journ. Bot.* vi. (1854) 70; *Enum.* 39; leaves ovate shortly caudate-acuminate base cordate or rounded midrib and lateral nerves depressed above, panicles about 1 in. many-flowered. *A. DC. Prodr.* xvi. 2, 237. Vateria cordifolia, *Thwaites Enum.* 404.

CEYLON; Ambagamowa and Saffragam districts, elevation about 3000 ft., *Thwaites.*

A moderate-sized much branched tree; young parts puberulous or glabrescent. *Leaves* 2–4½ by 1–2¼ in., glabrous on both surfaces, opaque above, lateral nerves about 7 pairs; petiole ⅓–1 in., tumid at the apex. *Flowers* drooping, yellow. *Calyx-segments* lanceolate, acute. *Fruit* the size of a pea, brown, mottled.

2. **M. elegans,** *Thwaites in Hook. Journ. Bot.* vi. (1854) 69, t. 2 B; *Enum.* 39; leaves elliptic abruptly and slenderly caudate-acuminate midrib depressed lateral nerves prominent above, peduncles 1–4-flowered about ¾ in. *A. DC. Prodr.* xvi. 2, 636. Vateria elegans. *Thwaites Enum.* 404.

CEYLON; Saffragam district, alt. about 2000 ft., *Thwaites.*

A moderate-sized tree; young parts glabrescent. *Leaves* 2½–3 by ¾–1 in., base obtuse or rounded, lateral nerves about 10 pairs; petiole ⅓ in. *Calyx-segments* linear-lanceolate. *Petals* oblong, obtuse, pale-yellow. *Anthers* lanceolate, pulverulent. *Fruit* globose, $\frac{5}{12}$ in. diam., with a drooping peduncle.

An imperfect fruiting specimen of a large tree collected by Major Beddome in South Tinnivelly and there called Karanyongoo, appears to belong to a new genus intermediate between *Pachynocarpus* and *Vatica.*—Twigs brown barked, with minute white spots. *Leaves* 3½–4½ by 1¼–1½ in., lanceolate, obtuse, entire, lateral nerves 10 pairs, scarcely prominent; petiole about ½ in. *Flowers* in short terminal or axillary puberulous panicles; pedicels ⅛ in. *Calyx-tube* very short, segments ⅛ in., ovate, minutely acuminate, thickened, with numerous minute pale warts externally. *Capsule* ⅝ in. diam., nearly globose, apiculate, glabrous, striate. *Seed* solitary; cotyledons fleshy, deeply 2-fid, enclosing the superior radicle.

ORDER XXVI. MALVACEÆ. (By Maxwell T. Masters, F.R.S.)

Herbs, shrubs or rarely soft-wooded trees, with mucilaginous rarely acid juice, and tenacious inner bark; herbaceous portions generally more or less densely covered with stellate hairs. *Leaves* alternate, palminerved, simple lobed or rarely compound. *Stipules* free, sometimes caducous. *Bracteoles* 3 or more, scattered or approximate, free or combined, often forming an epicalyx. *Flowers* axillary or terminal, solitary fascicled or cymoso-paniculate, regular, hermaphrodite or 1-sexual. *Sepals* 5, valvate, free or connate. *Petals* 5, twisted-imbricate. *Stamens* ∞, rarely definite, adnate to the base of the petals; filaments monadelphous, forming a tube, rarely a column; anthers oblong or reniform, cells sinuous or twisted, linear or annular, ultimately 1-celled, bursting longitudinally; pollen globose, granular, muriculate. *Ovary* 2- many-celled, entire, or lobed, of 2–5 or usually more carpels whorled round a central axis; styles connate below or throughout their length; stigmas linear peltate spathulate or capitate; ovules 1 or more, curved, attached to the inner angle of each carpel. *Fruit* of dry indehiscent or dehiscent cocci, or capsular and loculicidal, sometimes large and woody. *Seeds* reniform or obovid, glabrous hairy silky or woolly;

albumen scanty often mucilaginous or 0; embryo curved; cotyledons leafy, usually folded or crumpled.—DISTRIB. Abundant in warm regions, common in temperate, absent from arctic. Genera 57, known species about 700, largely represented in India. A few genera are peculiar to India or the Archipelago, and some of the species are also endemic.

A. Andrœcium tubular; tube entire, or but slightly divided at the apex.

TRIBE I. **Malveæ.** Herbs or shrubs. *Ripe carpels* separating from the axis. *Styles* as many as the carpels.

Ovules solitary, ascending.	
Stigmas linear.	
Bracteoles 6–9	1. ALTHÆA.
Bracteoles 3, connate	2. LAVATERA.
Bracteoles 3, free	3. MALVA.
Stigmas capitate	3.* MALVASTRUM.
Ovules solitary, pendulous.	
Carpels spreading, beakless	3.** ANODA.
Carpels convergent at the points or beaked	4. SIDA.
Ovules 2 or more.	
Carpels with a transverse false partition	4.* WISSADULA.
Carpels with no false partition	5. ABUTILON.

TRIBE II. **Ureneæ.** *Styles or stigmatic branches* twice as many as the carpels.

Carpels opposite the petals.	
Carpels unarmed	5.* MALACHRA.
Carpels beset with spines	6. URENA.
Carpels opposite the sepals	7. PAVONIA.

TRIBE III. **Hibisceæ.** Herbs or shrubs. *Fruit* capsular. *Sepals* leafy. *Staminal-tube* truncate or 5-toothed at the apex.

Stigmas spreading. Seeds reniform.	
Ovary 10-celled	8. DECASCHISTIA.
Ovary 2–5-celled.	
Stamens 10	9. JULOSTYLES.
Stamens numerous.	
Bracteoles 4, lanceolate combined at the base	10. DICELLOSTYLES.
Bracteoles 3, cordate	11. SENRA.
Bracteoles 5 or more	12. HIBISCUS.
Stigmas coherent in a club-shaped mass.	
Bracteoles 3–5, small	13. THESPESIA.
Bracteoles 3, large, cordate	14. GOSSYPIUM.

B. Andrœcium either tubular at the base only, and divided above into pentadelphous filaments (rarely tubular higher up); or divided throughout into filaments.

TRIBE IV. **Bombaceæ.** Trees. *Sepals* leathery. *Styles* connate or free. Fruit capsular or indehiscent.

Leaves simple or lobed. Bracteoles 4–5	15. KYDIA.
Leaves digitate. Bracteoles 0.	
Calyx 5-cleft	15.* ADANSONIA.
Calyx truncate or irregularly 3–5-lobed.	
Ultimate filament with a single anther	16. BOMBAX.
Filaments with 2–3 anthers	17. ERIODENDRON.
Leaves simple 1-costate, scaly.	
Bracteoles united into a tube.	
Petals 0	18. CULLENIA.

Petals 5.
  Calyx tubular or bell-shaped.
    Anthers linear, cells sinuous . . . . 19. Durio.
    Anthers globose, opening by a pore . . . . 20. Boschia.
  Calyx dilated at the base.
  Calyx cushion-shaped or orbicular. . . . . 21. Neesia.
  Calyx 5-pouched at the base . . . . 22. Cœlostegia.

1. **ALTHÆA,** Linn.

Herbs pubescent or villous, erect or decumbent. *Leaves* more or less deeply divided, rarely entire. *Flowers* peduncled, axillary, solitary or fascicled, often in long terminal racemes. *Bracteoles* 6–9, connate at the base. *Anther-valves* subglobose or linear. *Ovary* many-celled; styles filiform, inner surface stigmatose; ovules 1 in each cell. *Carpels* numerous, ultimately separating from a short torus. *Seed* solitary in each carpel, ascending.—Distrib. Temperate regions, rare in the tropics; known species about 12.

Althœa rosea, L., the common Holly-hock, is often cultivated in Indian Gardens: it is *A. coromandelina*, Cav., and *A. chinensis*, Wall. Cat. 2689.

1. **A. Ludwigii,** *L.; DC. Prodr.* i. 437; annual, hispid, prostrate or ascending, leaves deeply lobed lobes 3-fid, flowers shortly peduncled few or tufted, anther-valves subglobose, carpels glabrous. *Cav. Ic.* 423; *Boiss. Flor. Orient.* i. 824. Malva malwensis, *Edgew. in Hook. Journ. Bot.* ii. 284.

North Western India, the Panjab, and Sindh.—Distrib. Western Asia and the Mediterranean region; S. Africa.

Stem 6–12 in high, slender, branching. *Leaves* long-petioled, orbicular, 5–7-lobed, lobes wedge-shaped. *Bracteoles* 7–9, as long as the calyx. *Flowers* whitish, ½–¾ in. diam. *Petals* exceeding the lanceolate sepals. *Carpels* wrinkled at the sides.

2. **A. officinalis,** *L.; DC. Prodr.* i. 436; perennial, uniformly downy, leaves ovate simple or slightly lobed, flowers peduncled in axillary clusters, bracteoles linear-lanceolate, anther-valves subglobose. *Boiss. Flor. Orient.* i. 825.

Kashmir, *Jacquemont*, &c.—Distrib. Westward to England.

Stem erect, 2–3 ft. *Leaves* ovoid, annular, base scarcely cordate, unequally toothed; stipules linear-subulate. *Flowers* 1–2 in. diam., rosy. *Bracteoles* half the length of the sepals.—The Marsh Mallow, which yields Guimauve.

Var. *taurinensis;* not so densely downy as the type, flowers comparatively few. A. taurinensis, *DC. Prodr.* i. 436.

2. **LAVATERA,** Linn.

Herbs with branching downy stems. *Leaves* lobed. *Flowers* peduncled, axillary. *Bracteoles* 3, connate at the base. *Ovary* many-celled; styles filiform, inner surface stigmatose; ovules 1 in each cell. *Ripe carpels* numerous, surrounding a prominent conical torus, from which they ultimately separate. *Seed* solitary, ascending.—Distrib. Chiefly Mediterranean; one is Australian, two are Canarian.

1. **L. Kashmiriana,** *Camb. in Jacq. Voy. Bot.* 29, t. 32.]

Kashmir, *Jacquemont*, &c.

A branching downy herb. *Lower leaves* with petioles as long as the blade, orbicular, cordate, 5-lobed, lobes crenate nearly glabrous above, downy beneath, upper with petiole shorter than the blade, 3–5-lobed, lobes acute, central longest; stipules linear-lanceolate. *Peduncles* about equalling the leaves. *Bracteoles* 3, broadly ovate, acute, combined at the base. *Sepals* lanceolate, longer than the bracteoles. *Corolla* 3 in. diam., pink; petals cuneate, deeply 2-fid. *Staminal column* villous. *Carpels* reniform, smooth, shorter than the projecting torus.

3. **MALVA,** Linn.

Downy herbs. Leaves lobed. *Flowers* in axillary tufts. *Bracteoles* 3, distinct. *Sepals* 5, connate at the base. *Petals* emarginate, connate at the extreme base. *Staminal-tube* antheriferous to the top, without sterile teeth. *Ovary* many-celled; styles as many as the carpels, stigmas linear; ovules 1 in each cell. *Ripe carpels* 1-seeded, indehiscent, separating from a short conical *torus*. Seed ascending.—DISTRIB. Temperate regions of the Old World. Species about 16; many are widely diffused by cultivation, &c. None of the Indian species are endemic.

1. **M. verticillata,** *L.; DC. Prodr.* i. 433; an erect annual or perennial, pubescent, flowers nearly sessile in dense axillary clusters. *Wall. Cat.* 1879, 1884, 3, 4. M. neilgherrensis, *Wight Ic.* t. 950. M. alchemillæfolia, *Wall. Cat.* 1884, d.

TEMPERATE HIMALAYA, ascending to 6–12,000 ft., from Assam and Sikkim to Kumaon and Lahul; NILGHIRIS MTS., in corn fields, *Wight.*—DISTRIB. Europe, Abyssinia, Egypt, Amoor land, China.

Stem branched, 2–4 ft. high. *Leaves* cordate, suborbicular, 5–6-lobed, downy; petiole 6–7 in. *Flowers* small, nearly sessile, densely crowded. *Bracteoles* linear. *Sepals* deltoid-lanceolate. *Petals* notched, slightly longer than the sepals. *Carpels* 10–12, enclosed within the accrescent calyx, netted on the sides, prominently ribbed at the back.

2. **M. silvestris,** *L.; DC. Prodr.* i. 432; an erect nearly glabrous herb, peduncles as long or longer than the flowers erect or ascending. *Boiss. Flor. Orient.* i. 819.

WESTERN TEMPERATE HIMALAYA, from Kumaon, alt. 2500 ft., to KASHMIR and the PANJAB.—DISTRIB. Europe, N. Africa, Siberia.

Annual, 1–3 ft. high. *Leaves* cordate, rounded, lobed; petiole 4–5 in. *Peduncles* about 1 in. *Bracteoles* ovate, entire, shorter than the bell-shaped *calyx*. *Corolla* 1½ in. diam. *Petals* notched, claw-bearded. *Carpels* reticulated, downy or glabrous.

VAR. 1. *mauritiana;* carpels reticulated, glabrous. *M. mauritiana*, DC. Prodr. i. 432, Cav. Diss. ii. 25, f. 2; Roxb. Fl. Ind. iii. 181; W. & A. Prodr. i. 45; Wall. Cat. 1877; Boiss. Fl. Orient. i. 819.—Bengal, Western Peninsula. *M. ciliata*, Wall. Cat. 1878.

VAR. 2. *eriocarpa*, Boissier Fl. Orient. i. 819; carpels reticulated downy.—Himalaya.

3. **M. rotundifolia,** *L.; DC. Prodr.* i. 433; a spreading herb, slightly downy, peduncles deflexed after flowering, claw of petal bearded. *Wall. Cat.* 1885; *Boiss. Flor. Orient.* i. 820. M. vulgaris, *Fries. Novrit.* 219.

NORTH-WEST PROVINCES; KUMAON and SINDH.—DISTRIB. Europe, W. Asia.

A much-branched herb, sparingly villous. *Leaves* suborbicular, lobed, crenate; petiole 6–7 in. *Peduncles* 1½ in. *Bracteoles* lanceolate half the length of the broadly lance-shaped sepals. *Corolla* 1 in. diam. *Petals* wedge-shaped, notched, twice the length of the sepals. *Ripe carpels* downy, flat or wrinkled.

VAR. 1. *borealis;* petals scarcely exceeding the sepals, carpels prominently wrinkled and netted. *M. rotundifolia*, Roxb. Fl. Ind. iii. 181; *M. borealis*, Wallm. ex Boiss. Flor. Orient. i. 820; *M. rotundifolia* var. β, W. & A. Prod. i. 45; Wall. Cat. 1884, e, f; *M. parviflora*, Huds. not of Linn.—Bengal, Mysore.

VAR. 2. *reticulata;* petals exceeding the calyx; carpels glabrous, wrinkled, *M. rotundifolia*, var. α, W. & A. Prodr. i. 45; Wall. Cat. 1884, e.—Bengal, North-West Himalaya, alt. 1–2000 ft.

4. **M. parviflora,** *L.; DC. Prodr.* i. 433; a spreading herb, slightly downy, peduncles spreading after flowering, claw of petal glabrous. *Boiss. Flor. Orient.* i. 820.

North-West Himalaya, alt. 1–2000 ft., Upper Bengal, Sindh and the Panjab.—Distrib. Europe, the Levant, Arabia, Nubia.

A comparatively small spreading herb. *Leaves* roundish, obsoletely lobed; peduncles short. *Bracteoles* linear. *Sepals* broad, acute. *Petals* notched, scarcely exceeding the sepals. *Carpels* wrinkled.

3.* MALVASTRUM, A. Gray.

Herbs or undershrubs. *Leaves* entire or divided. *Inflorescence* axillary or terminal. *Bracteoles* 3, narrow. *Calyx* cup-shaped, 5-parted. *Petals* longer than the sepals. *Staminal-tube* antheriferous to the summit, with no sterile teeth. *Ovary* 5- or more-celled; styles as many as the carpels, stigmas capitate. *Ripe carpels* separating from a short torus, indehiscent, 1-seeded, beaked or not. *Seed* ascending.—Distrib. About 60 species, all American and S. African except 2, which are widely distributed throughout the tropics of both hemispheres.

M. tricuspidatum, *A. Gray Pl. Wright*, 16; hairs simple, carpels with three small projecting points. Malva tricuspidata, *Ait.; DC. Prodr.* i. 430.

Various parts of Bengal and Madras, introduced.—Distrib. Tropics of both hemispheres and Australia.

An erect branching herb, 2–3 ft. high. *Leaves* ovate-lanceolate, irregularly toothed, feather-veined. *Petiole* 1¼ in. *Peduncles* ¼–½ in. *Bracteoles* narrow. *Calyx* campanulate, 5-fid, lobes triangular acute. *Petals* yellow. *Carpels* 8–12, reniform.

M. spicatum, *A. Gray Pl. Fendler*, 22; hairs stellate, carpels rounded or angular not beaked. Malva spicata, *L.; DC. Prodr.* i. 430.

Various parts of India, introduced; Mergui, *Griffith*.—Distrib. Tropics of both hemispheres.

An erect herb, 1–2 ft. high. *Leaves* ovate, acute, crenate-serrate, sometimes lobed. *Flowers* in a dense terminal leafy spike. *Bracteoles* narrow. *Sepals* acuminate. *Petals* yellow. *Carpels* 8–12, pubescent.

3.** ANODA, Cav.

Hispid herbs. *Leaves* hastate-lobed. *Flowers* on long axillary peduncles. *Bracteoles* 0. *Calyx* 5-parted, segments spreading. *Petals* 5. *Staminal-tube* dividing into numerous filaments at the top. *Ovary* many-celled; styles as many as the cells of the ovary; ovules 1 in each cell. *Ripe carpels* separating from the axis, bursting irregularly, 1-seeded.—Distrib. An American genus of 8 species, not indigenous in India.

A. hastata, *L.; DC. Prodr.* i. 458; thinly clothed with appressed hairs, leaves ovate-cordate hastate 5-lobed, lobes deltoid central one longest.

Various places in North-Western India and the Western Peninsula, but not indigenous.—Distrib. W. Indies, &c.

A herb 2–3 ft. high, thinly beset with appressed hairs. *Leaves* 2–3 in.; petioles 1½ in. *Stipules* linear, ½ in. long. *Peduncles* 4 in., 1-flowered. *Flowers* 1½ in. diam. *Sepals* 5, broadly ovate, acute, spreading, connate at the base into a shallow tube. *Petals* purple, longer than the sepals.

4. **SIDA,** Linn.

Herbs or undershrubs. *Leaves* simple or lobed. *Bracteoles* 0. *Calyx* of 5 valvate sepals, tubular below. *Corolla* of 5 petals, free above, connate below and adnate to the tube of the stamens. *Staminal-tube* dividing at the summit into numerous anther-bearing filaments. *Carpels* 5 or more, whorled; styles as many as the carpels, stigmas terminal. *Ripe carpels* separating from the axis, generally 2-awned at the summit, and dehiscing irregularly or by a small chink. *Seed* solitary, pendulous or horizontal; radicle superior.—DISTRIB. A genus of about 80 species, most of them being tropical weeds.

* *Herbaceous, often trailing.*

1. **S. humilis,** *Willd.; DC. Prodr.* i. 463; a trailing herb, leaves suborbicular-cordate acute serrate slightly hairy, carpels 5 sometimes awned. *Cav. Diss.* v. t. 134, f. 2; *Roxb. Fl. Ind.* iii. 171; *Thwaites Enum.* 28; *Dalz. & Gibs. Bomb. Fl.* 17; *Wall. Cat.* 1854, 1, 2, 3, D; *W. & A. Prodr.* i. 59; *Miq. Fl. Ind. Bat.* i. pt. 2, 140. S. unilocularis, *L'Her. Stirp.* t. 56. S. pilosa, *Retz, not of Cav. ex W. & A. l.c.; Wall. Cat.* 1854, E. S. radicans, *Wall. Cat.* 1854 G. S. multicaulis, *Cav. Diss.* i. 10, t. 1, f. 6; *DC. l.c.* S. nervosa, *Wall. Cat.* 1853, *not of DC.*

Generally distributed throughout the hotter parts of India. DISTRIB. Tropical Africa and America.

Very variable. *Stem* usually procumbent, branching, covered, like the leaves, with a few scattered radiating hairs; petiole rather shorter than the blade. *Peduncles* jointed in the middle, distant or arranged in a loose raceme. *Flowers* axillary, solitary or twin. *Calyx-segments* triangular, very acute. *Corolla* straw-coloured, scarcely exceeding the calyx. *Carpels* 5, muticous or shortly bicuspidate.—The specimens vary so much in quality of pubescence, length of carpellary awns, &c., that I find it difficult to determine the following varieties with accuracy.

VAR. 1. *morifolia,* Cav. Diss. i. 9, t. 1, f. 1 (sp.); carpels slightly mucronate.—*Wall. Cat.* 1853 B, E.

VAR. 2. *veronicæfolia,* Lam. Dict. n. 11 (sp.); carpels with two longish awns.—*Cav. Diss.* i. 7, t. 1, f. 3 and 5; *Wall. Cat.* 1853 D.

2. **S. mysorensis,** *W. & A. Prodr.* i. 59; herbaceous, covered with glutinous hairs, leaves cordate-ovate acuminate, peduncles shorter than the petioles, carpels 5 awned keeled. *Thwaites Enum.* 28. S. hirta, *Wall. Cat.* 1855, *not of Lam.* S. urticæfolia, *W. & A. l.c.* S. nervosa, *Wall. Cat.* 1853 E. S. olens, *Ham. in Wall. Cat.* 1874. S. glutinosa, *Roxb. Hort. Beng.* 97; *Fl. Ind.* iii. 172; *Wall. Cat.* 1855, *not of Cav.* S. tenax, *Ham. in W. & A. Prodr.* i. *l.c.*; *Wall. Cat.* 1855, E, F. ? S. radicans, *Cav. Diss.* i. p. 8; *W. & A. Prodr.* i. 59.—*Rheede Hort. Mal.* x. 69.

BHOTAN, TENASSERIM, COROMANDEL, MYSORE, CONCAN, CEYLON.

A herb or undershrub 1–2 ft. high. *Leaves* 2½ by 2 in., coarsely toothed, downy beneath; petiole 1½ in. *Peduncle* jointed in the middle. *Flowers* scarcely ½ in. diam. —Perhaps not specifically distinct from *S. humilis.*

** *Suffrutescent (except* S. corylifolia*) erect or rarely procumbent.*

3. **S. Schimperiana,** *Hochst. in Rich. Fl. Abyss.* i. 66; perennial, shrubby, branches repeatedly forked, leaves oblong retuse base cuneate, carpels 5 subglobose beaks short connivent. *Mast. in Oliv. Fl. Trop. Afr.* i. 180. Sida cuneifolia, *Roxb. Fl. Ind.* iii. 170. Dictyocarpus truncatus, *Wight in Ann. Sc. Nat. ser.* 2, xi. 169; *Madras Journ. Lit. & Sc.* v. t. 19. Melochia truncata *and* Hermannia alnifolia, *Wall. Cat.* 1196 K.

WESTERN PENINSULA; Carnatic and the Dekkan, *Wight*, &c.—DISTRIB. Abyssinia, S. Africa.

A woody undershrub, with a thick rootstock. *Branches* intricate, decumbent or erect. *Leaves* ½ in., sparingly covered with stellate hairs, petiole very short. *Flowers* solitary, axillary, shortly petioled. *Sepals* 5, connate below the middle in a cup shaped tube. *Petals* pink. *Carpels* ultimately dehiscing along the inner edge.

4. **S. spinosa,** *L.; DC. Prodr.* i. 460; shrubby, erect, branches often with spiny tubercles below the variable leaves, which are hoary beneath, carpels 5, beaks erect. S. alba, *L.; W. & A. Prodr.* i. 58; *DC. Prodr. l.c.*; *Roxb. Fl. Ind.* iii. 174; *Thwaites Enum.* 28; *Dalz. & Gibs. Bomb. Fl.* 17. S. retusa, *Wight Cat.* 195, *not of Linn.* S. alnifolia, *L.; DC. Prodr.* i. 461; *Roxb. Fl. Ind.* iii. 174; *W. & A. Prodr.* i. 58; *Wall. Cat.* 1873. S. glandulosa, *Roxb. mss. ex W. & A. Prodr.* i. *l.c.* S. Boriara, *Wall. Cat.* 1872.

Hotter parts of India, from the NORTH-WEST PROVINCES to CEYLON.—DISTRIB. Tropics generally.

Leaves about ¾ in., ovate obovate or linear-lanceolate, obtusely serrate, base cordate, sometimes cuneate: petiole ½ in. *Peduncles* solitary or clustered, jointed near the flower, equalling or exceeding the petiole. *Sepals* deltoid, connate below into a cup-shaped tube. *Carpels* membranous, scarcely longer than the calyx.

5. **S. grewioides,** *Guill. & Perr. Fl. Seneg.* i. 71; a cano-tomentose undershrub, leaves oblong-ovate obtuse, calyx-tube angular, carpels 7–8 wrinkled awned, beaks connivent. *Boiss. Fl. Orient.* i. 835; *Mast. in Oliv. Fl. Trop. Afr.* i. 182.

NORTH-WEST PROVINCES and SINDH.—DISTRIB. Arabia, Tropical Africa.

Leaves about ½ in., crenate, downy on both surfaces; petiole shorter than the blade. *Stipules* linear-subulate, scarcely so long as the petiole. *Peduncles* solitary or twin, shorter than the petioles. *Flowers* yellow, small. *Carpels* indehiscent, or nearly so.

6. **S. carpinifolia,** *L.; DC. Prodr.* i. 460; an undershrub, leaves nearly glabrous narrow acuminate serrate, stipules linear-subulate longer than the petiole, peduncle jointed in the middle as long as the petiole, sepals triangular acute, calyx-tube subglobose, carpels 5–9 rugose awned. *Wall. Cat.* 1871. S. acuta, *Burm.; Cav. Diss.* i. t. 2, f. 3; *DC. Prodr.* i. 461; *Wall. Cat.* 1868, 1, 2, 3, 4, 5; *Roxb. Fl. Ind.* iii. 171; *W. & A. Prodr.* i. 57; *Dalz. & Gibs. Bomb. Fl.* 17; *Thwaites Enum.* 27; *Wight Ic.* t. 95; *Wall. Cat.* 1868 G. S. lanceolata, *Roxb. l.c.* 175; *Wall. Cat.* 1868 F. S. stipulata, *Cav. Diss.* i. t. 3, f. 10; *DC. Prodr.* i. 460; *W. & A. Prodr. l.c.* S. Stauntoniana, *DC. l.c.*; S. scoparia, *Lour. ex W. & A. l.c.*—Rheede, *Hort. Mal.* x. t. 53.

Generally distributed throughout the hotter parts of India.—DISTRIB. Tropics generally.

Perennial. *Leaves* about 2–3 in., linear-lanceolate; petiole $\frac{1}{16}$–$\frac{1}{12}$ in.; stipules many-nerved, two or three times longer than the petiole. *Petals* yellow, twice the length of the calyx.—De Candolle's *S. compressa*, from Nipal, which I have not seen, is described as having the leaves hoary beneath, and the peduncles three times as long as the petiole.

7. **S. rhombifolia,** *Linn.*; shrubby, erect, leaves polymorphous tapering at the base, peduncle longer than the petiole, carpels 10 awned or not, as long as the calyx. *DC. Prodr.* i. 462; *Roxb. Fl. Ind.* iii. 176; *Wall. Cat.* 1862, 2; *Thwaites Enum.* 28. S. canariensis, *Willd.*; *DC. Prodr.* i. 462. Sida compressa, *Wall. Cat.* 1866; *DC. Prodr.* i. 462.

Widely distributed throughout India.—DISTRIB. Tropics of both hemispheres.

Very variable, perennial, glabrous or with scattered stellate hairs. *Leaves* generally more or less rhomboid, under side hoary, rarely green; stipules linear-setaceous, longer than the petiole. *Peduncle* rarely less than twice as long as the petiole, axillary or clustered at the ends of the branches. *Flowers* yellow, rarely white. *Sepals* deltoi acuminate. *Carpels* smooth or reticulate.—Very variable in form of leaf, relative length of peduncle, position of joint, and size of the carpellary awns.—This species and its allies yield good fibre.

The following forms may be more or less readily distinguished, and many more might be added, but their characters merge so much one into the other, that discrimination becomes difficult.

VAR. 1. *scabrida*, W. & A. Prodr. i. 57 (sp.); sprinkled with rigid hairs, leaves concolorous, peduncles jointed at the base, carpels awned.

VAR. 2. *retusa*, Linn. (sp.); leaves obovate retuse hoary underneath, peduncles equalling the leaves jointed above the middle, carpellary awns short.—*Cav. Diss.* i. t. 3, f. 4, and *Diss.* v. t. 131, f. 2; *W. & A. Prodr.* i. 58; *Wall. Cat.* 1870; *DC. Prodr.* i. 462; *Roxb. Fl. Ind.* iii. 175; *Dalz. & Gibs. Bomb. Fl.* 17. S. chinensis, *Retz ex Roxb. Hort. Beng.* 97; *Fl. Ind.* iii. 174. S. philippica, *DC. Prodr.* i. 462; *W. & A. Prodr. l.c.; Wall. Cat.* 1869; *Rheede Hort. Mal.* x. 18; *Rumph. Amb.* v. t. 19.—The S. corynocarpa, *Wall. Cat.* 1870, seems to be a form of this variety, with densely intricate woody branches, and long carpellary awns.

VAR. 3. *rhomboidea*, Roxb. Hort. Beng. 50, Fl. Ind. iii. 176 (sp.); leaves rhomboid hoary beneath, peduncles jointed at the base, carpellary awns very short inflected. *DC. Prodr.* i. 462; *W. & A. Prodr.* i. 57; *Wall. Cat.* 1862 E, 1868; *Thwaites Enum.* 28. S. rhombifolia, *Wall. Cat.* 1862 F. ? S. orientalis, *Cav. Diss.* i. t. 12.—The flowers expand at noon (*Roxb*).

VAR 4. *obovata*, Wall. Cat. 1864 (sp.); leaves 1½ by 2 in. broadly obovate hoary beneath. apex coarsely toothed, base cuneate, petiole ¼ in., peduncle longer than the petiole shorter than the blade.

VAR. 5. *microphylla*, Cav. Diss. i. t. 12, f. 2 (sp.); leaves small elliptic dentate hoary beneath, peduncle slightly exceeding the petiole, carpels 5–7 awned.—*Roxb. Fl. Ind.* iii. 170; *DC. Prodr.* i. 461.

8. **S. corylifolia,** *Wall. Cat.* 1865; leaves oblong glabrous on both surfaces crenate-serrate base rounded, peduncle longer than the petiole jointed above the middle, carpels smooth, awns long erect covered with reflexed bristles.

BIRMA, *Wallich.*

Herbaceous *Leaves* 4 by 2 in., concolorous; petiole 1¼ in.; stipules deciduous. *Peduncle* 1½ in. *Calyx* broad, cup-shaped, ½ in. diam., glabrous; sepals deltoid, acute, shorter than the carpellary awns.—Resembles *S. cordifolia* in the long awns.

9. **S. cordifolia,** *L.; DC. Prodr.* i. 464; downy, erect, leaves cordate-oblong obtuse crenate, carpels 10 awned awns longer than the calyx covered with stiff reflexed hairs. *Roxb. Fl Ind.* iii. 177; *Wall. Cat.* 1849; *W. & A. Prodr.* i. 58; *Thwaites Enum.* 28; *Dalz. & Gibs. Bomb. Fl.* 17; *Mast. in Oliv. Fl. Trop. Afr.* i. 181; *Miq. Fl. Ind. Bat.* i. pt. 2, 140. S. herbacea, *Cav. Diss.* i. 19, t. 13, f. 1; *DC. Prodr.* i. 463 S. micans, *Cav. Diss.* i. 19, t. 3, f. 1. S. rotundifolia, *Cav. Diss.* i. 20, t. 3, f. 6, and *Diss.* vi. t. 194, f. 2; *Wall. Cat.* 1849, D; *DC. Prodr.* i. 464. S. althæifolia, *Swartz; Guill. & Per. Fl. Seneg.* i. 73.—*Rheede Hort. Mal.* x. t. 54.

Generally distributed throughout tropical and subtropical India.—DISTRIB. A tropical weed.

Annual or perennial. *Leaves* 1½–2 by 1–1¼ in., very downy on both surfaces; petiole as long as the leaf; stipules linear, half the length of the petiole. *Peduncles* jointed near the flower, lower distant longer than the petioles, upper crowded very short. *Flowers* yellow. *Carpels* furrowed at the back, sides reticulated.—Flowers with the other species in the rainy and cool seasons.

DOUBTFUL SPECIES.

S. PENTACARPOS, *Roxb. ex Horn. Supp.* 78; *DC. Prodr.* i. 473, an annual plant having cordate sub-tricuspidate leaves, peduncles as long as the petioles, and muticous very hispid carpels.—*Kosteletzkya pentacarpos* is not a native of India.

4.* WISSADULA, Medik.

Undershrubs, more or less beset with soft hairs. *Leaves* palmately lobed. *Inflorescence* lax, panicled. *Bracteoles* 0. *Calyx* of 5 sepals which are free above tubular below. *Petals* 5, connate below and adherent to the tube of the stamens. *Staminal-tube* divided at the apex into numerous filaments. *Styles* as many as the cells of the ovary. *Ripe carpels* 5, many-seeded, beaked, dehiscent, often with a transverse false partition. *Seeds* 1–3 in each cell, lower descending, upper ascending.—DISTRIB. Species 5 or 6 tropical American, and one common in all the hotter parts of the globe. In habit they differ from the species of *Sida* and *Abutilon*.

W. ROSTRATA, *Planch. in Hook. Niger Flora*, 229; peduncle longer than the petiole, carpels with a false partition. *Mast. in Oliv. Fl. Trop. Afr.* i. 182. W. periplocifolia, *Thwaites Enum.* 27. W. zeylanica, *Medik.*; *Miq. Fl. Ind. Bat.* i. pt. 2, 147. Abutilon periplocifolium, *G. Don Gen. Syst.* i. 500; *W. & A. Prodr.* i. 55. Sida periplocifolia, *L.*; *DC. Prodr.* i. 467; *Roxb. Fl. Ind.* iii. 172; *Wall. Cat.* 1861, B, C, D.

Cultivated in India, naturalized in Ceylon, and very common in the south of the island.—DISTRIB. Java, Tropical Africa and America.

Suffrutescent, more or less densely clothed with stellate tomentum. *Leaves* 3–4 by 1½–2 in. and upwards, glabrous above, pubescent beneath, cordate-oblong, entire, tapering into a long point; petiole 1 in. *Flowers* yellow, in lax panicles. *Peduncles* 3 in., jointed near the top. *Calyx* campanulate, 5-cleft. *Petals* exceeding the calyx. *Ripe carpels* awned, much longer than the calyx.—Roxburgh says this is a native of the Malay islands, and yields a beautiful hemp.

VAR. 1. *zeylanica*, DC. Prodr. i. 467; leaves narrow, slightly scabrid above.—*Pluk.* t. 74, f. 7; *Dill. Hort. Elth.* i. t. 3, f. 2.

W. LESCHENAULTIANA, peduncles not exceeding the petiole, carpels without false partitions. Sida Leschenaultiana, *DC. Prodr.* i. 468. Abutilon Leschenaultianum, *Don Gen. Syst.* i. 500.

Cultivated in India and in Ceylon; its native country not known.

Suffrutescent, softly downy. *Leaves* 2–3 by 2½–3½ in., glabrescent above, softly tomentose beneath, cordate-ovate, acuminate, quite entire; petiole 3–4 in. *Inflorescence* terminal, panicled, many-flowered. *Peduncles* 1–2 in. *Petals* obcordate. *Ripe carpels* ovoid.—In habit this plant agrees with *Wissadula*, but it is destitute of the false partitions in the carpel.

5. ABUTILON, Gærtn.

Herbs or undershrubs more or less covered with down. *Leaves* angled or palmately-lobed. *Inflorescence* axillary or terminal. *Bracteoles* 0. *Calyx* of 5 valvate sepals, tubular below. *Corolla* of 5 petals, free above, connate below and adnate to the tube of the stamens. *Staminal-tube* divided at the apex into numerous filaments. *Carpels* 5–∞. *Styles* as many as the carpels. *Ripe carpels* separating from the axis, awned or not, 1- or more-seeded. *Seeds* reniform, upper ascending, lower descending.—DISTRIB. About 70 species, all tropical or subtropical. As a genus hardly separable from *Sida*, except in habit and in the larger flowers, which latter (in the Indian species) usually open in the evening, while in the *Sidas* they expand about noon.

* *Carpels more than* 10 (*except in* A. polyandrum).

1. **A. polyandrum,** *Schlecht. in Link Enum Hort. Berol.* ii. 264; leaves roundish-cordate with a long acumen, filaments free nearly to the base, staminal-tube with a ring of hairs at the top, carpels 5 awned. *Don*

Gen. Syst. i. 500; *W. & A. Prodr.* i. 55; *Thwaites Enum.* 27; *Dalz. & Gibs. Bomb. Fl.* 17; *Miq. Fl. Ind. Bat.* i. pt. 2, 144. Sida oxyphylla, *Wall. Cat.* 1850. S. polyandra, *Roxb. Hort. Beng.* 50, *Fl. Ind.* iii. 173; *Wall. Cat.* 1851, D, E, F. S. persica, *Burm. Fl. Ind.* t. 47, f. 1; *Cav. Diss.* i. t. 4, f. 1; *DC. Prodr.* i. 473. S. macrophylla, *Wall. Cat.* 1851, D.

NORTH-WEST PROVINCES, TROPICAL HIMALAYA, WESTERN PENINSULA, BIRMA, CEYLON.—DISTRIB. Java, South Trop. Africa, Persia?

Annual or perennial. *Leaves* 4–5 in., downy, especially beneath; petiole 4 in. *Peduncles* clustered in small terminal racemes, jointed near the top. *Sepals* lanceolate, forming a bell-shaped tube below. *Corolla* 1½ in. diam. *Carpels* hispid exceeding the calyx, awns erect.

2. **A. asiaticum,** *G. Don Gen. Syst.* i. 503; leaves rugose above velvety beneath acute or acuminate, toothed, cordate at the base, sepals ovate acute or acuminate, petals overlapping, ripe carpels about 20 hispid scarcely longer than the calyx, awns erect. *Thwaites Enum.* 27; *W. & A. Prod.* i. 56; *Mast. in Oliv. Fl. Trop. Afr.* i. 184. Sida asiatica, *Linn. Sp.* 964; *Cav. Diss.* i. t. 7, f. 2, and v. t. 128, f. 1; *Miq. Fl. Ind. Bat.* i. pt. 2, 145; *L'Her. Stirp.* 130.

WESTERN PENINSULA; CEYLON.—DISTRIB. Tropics of both hemispheres.

Herbaceous or suffrutescent. *Leaves* 3–4 in. and more, subscabrid above, velvety beneath; stipules linear, deflexed. *Peduncles* stout, jointed near the flower, longer than the petiole. *Flowers* yellow, 2 in. diam. *Calyx* campanulate *Carpels* rarely muticous.

The synonymy of this and the two following species is much confused. The *A. asiaticum* of Wight's herbarium is indistinguishable from *A. indicum* of Don. The rugose upper surface of the leaf mentioned by L'Heritier is one of the best marks of this species, the shape of the calyx-lobes, and the relative size and amount of pubescence of the carpels is more variable.

3. **A. indicum,** *G. Don Gen. Syst.* i. 504; leaves cordate nearly entire or irregularly toothed covered on both surfaces with closely-felted white down with few or no hairs intermingled, sepals ovate acute, ripe carpels 15–20 longer than the calyx glabrescent truncate or shortly awned, awns spreading. A. asiaticum, *W. & A. Prodr.* i. 56, *not* Sida asiatica, *Linn.; W. & A. Prodr.* i. 56; *Wight. Ic.* t. 12; *Dalz. & Gibs. Bomb. Fl.* 18; *Thwaites Enum.* 27; *Mast. in Oliv. Fl. Trop. Afr.* i. 186; *Miq. Fl. Ind. Bat.* i. pt. 2, 146. Sida indica, *L.; DC. Prodr.* i. 471; *Cav. Diss.* i. p. 33, t. 7, f. 10; *Roxb. Fl. Ind.* iii. 179; *Wall. Cat.* 1859, 1, 2, D, F.

Generally distributed throughout tropical India (wanting in Malacca). CEYLON, *Thwaites.*—DISTRIB. Tropics.

Annual or perennial. *Stipules* deflexed. *Peduncles* longer than the petioles, jointed near the top. *Flowers* yellow, 1 in. diam., opening in the evening.

VAR. 1. *populifolium,* W. & A. Prodr. i. 56, var. β; leaves more or less acuminate. Abutilon populifolium, *G. Don Gen. Syst.* i. 503; Sida populifolia, *Lam.; Cav. Diss.* i. t. 7, f. 9; *DC. Prodr.* i. 470; *Roxb. Fl. Ind.* iii. 179; *Wall. Cat.* 1858; Sida Beloere, *L'Her. Stirp.* i. 130. S. Eteromischos, *Cav. Diss.* ii. 55, *and* v. p. 275, t. 128. —*Rumph. Amb.* iv. t. xi.; *Rheede Hort. Mal.* vi. t. 65.

Lamarck's plant is open to doubt, as the stem is described as purplish, and the stipules as spirally twisted.

4. **A. bidentatum,** *Hochst. in A. Rich. Fl. Abyss.* i. 68; leaves cordate-ovate acuminate crenate-toothed, stipules short subulate, panicles axillary, peduncles shorter than the leaves, ripe carpels 20 smooth exceeding the calyx, awns spreading. *Mast. in Oliv. Fl. Trop. Afr.* i. 186.

NORTH-WEST PROVINCES, *Edgeworth;* SINDH, *Stocks;* PANJAB, *T. Thomson;* CONCAN.—DISTRIB. Tropical Africa and Arabia.

Erect, perennial. *Leaves* 2½–3 by 2 in., downy on both surfaces, lower petioles 4–5 in. *Peduncles* 1½–2 in. *Sepals* ovate, acute. *Calyx-tube* cup-shaped. *Ripe fruit* ½ in. diam. *Carpels* oblong, glabrescent, twice the length of the calyx.

5. **A. graveolens,** *W. & A. Prodr.* i. 56; branches covered with clammy pubescence mixed with spreading hairs, leaves orbicular-cordate abruptly acuminate velvety on both sides, stipules falcate, peduncles as long as the petioles, sepals ovate acuminate, carpels 20 or more rounded hairy. *Mast. in Oliv. Fl. Trop. Afr.* i. 184; *Thwaites Enum.* 27. Sida graveolens, *Roxb. Hort. Beng.* 50, *Fl.; Ind.* iii. 179; *DC. Prodr.* i. 473; *Wall. Cat.* 1856, D, E, F, G. S. hirta, *Wall. Cat.* 1852, B *partly.*

NORTH-WEST PROVINCES, SINDH, NILGHIRRHIS MTS., and CEYLON.—DISTRIB. Beluchistan, Java, Tropical Africa and Australia.

Leaves sometimes lobed; petiole almost as long as the blade; stipules linear, reflexed. *Flowers* large, orange coloured, with a darker centre, ultimately reflexed. *Petals* obcordate. *Carpels* truncate, rather longer than the calyx, not awned.—The fresh plant, according to Roxburgh, has a strong unpleasant smell. There is no constant difference between this and the following form, but the var. *hirtum* is usually more densely hispid, and its carpels are more awned and scarcely exceed the calyx.

VAR. 1. *hirtum,* G. Don Gen. Syst. i. 503 (sp.); stem copiously hispid, pubescence brownish, leaves subscabrid above, stipules linear-subulate, carpels about 20, acute, hairy, about the length of the calyx.—Abutilon hirtum, *W. & A. Prodr.* i. 56; *Wall. Cat.* 1856; *Miq. Fl. Ind. Bat.* i. pt. 2, 145. Sida hirta, *Lam. Dict.* i. 7; *DC. Prodr.* i. 470; *Wall. Cat.* 1858 G; *Cav. Diss.* t. 129. S. pilosa, *L'Her. Stirp.* 130.

6. **A. muticum,** *G. Don Gen. Syst.* i. 502; pubescent and hairy, leaves roundish-cordate, sepals broad cuspidate, carpels about 20 reniform awnless downy shorter than the calyx. *Boiss. Fl. Orient.* i. 836. A. tomentosum, *W. & A. Prodr.* i. 56; *Thwaites Enum.* 27; *Dalz. & Gibs. Bomb. Fl.* 18. A. glaucum, *Don Gen. Syst.* i. 504; *Mast. in Oliv. Fl. Trop. Afr.* i. 185. Sida glauca, *Cav. Ic.* 1, 8, t. 11. S. hirta, *Wall. Cat.* 1852 B *partly.* S. villosa, *Wall. Cat.* 1856 C. S. asiatica, *Wall. Cat.* 1852 D. S. mutica, *Delile Flor. Egypt.* 60, n. 45. S. tomentosa, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 178; *Wall. Cat.* 1852 A, C, D, E.

NORTH-WEST PROVINCES, and WESTERN PENINSULA, *Stocks, Edgeworth,* &c. CEYLON, Tangalle, *Thwaites.*—DISTRIB. Affghanistan, Trop. Africa, Egypt.

Annual or suffrutescent. *Leaves* tomentose on both surfaces, toothed; petioles 2 in.; stipules lanceolate, reflexed. *Peduncles* as long as the petiole, stout, jointed near the flower, usually arranged in axillary nearly leafless clusters. *Flowers* large, orange. *Calyx* very tomentose, divided halfway down. *Petals* obliquely triangular, often lobed. *Fruit* globose, depressed at the summit. *Seeds* 3, scabrous.

7. **A. Avicennæ,** *Gærtn. Carp.* ii. 251; leaves orbicular-cordate with a long point, peduncle shorter than the petiole, sepals free nearly to the base, carpellary awns ultimately widely spreading. *Boiss. Fl. Orient.* i. 836. Sida Abutilon, *L.; DC. Prodr.* i. 470; *Roxb. Fl. Ind.* iii. 178.

NORTH-WEST INDIA, SINDH, KASHMIR, and BENGAL.—DISTRIB. N. Asia and westward to S. Europe, and also in N. America.

Annual, herbaceous, softly tomentose. *Leaves* 3–4 in.; petiole 3 in. *Peduncles* 1 in., solitary, axillary. *Sepals* ovate, acute. *Petals* yellow, hardly exceeding the sepals. *Staminal-tube* very short. *Carpels* 15–20, much exceeding the sepals, oblong, truncate, hispidulous or pubescent, with 2 long horizontal spreading ciliolate awns. *Seeds* pilose.

8. **A. crispum,** *G. Don Syst.* i. 502; pubescent and hairy, leaves cordate roundish acuminate-crenate upper petioled or nearly sessile, fruit

globose bent downwards when ripe, carpels 12 or more wrinkled membranous awnless. *Wight Ic.* t. 68; *W. & A. Prodr.* i. 56; *Thwaites Enum.* 401. Sida crispa *L.; DC. Prodr.* i. 469; *Roxb. Fl. Ind.* iii. 177; *Wall. Cat.* 1857 C, D, E, F. S. indica, *Cav. Diss.* 33, tab. 7, f. 10? *and of Herb. Heyne.* S. montana, *Roxb. Ic. ined.*

WESTERN PENINSULA; Nilghirrhis Mts., the Dekkan, and Coromandel.—DISTRIB. Tropical and subtropical America.

A weak diffuse annual. *Leaves* 2–3 by 1½ in.; stipules filiform. *Peduncles* as long as the petiole, geniculate above the middle. *Flowers* small, yellow. *Calyx* tubular below, divided beyond the middle into lanceolate sepals. *Carpels* obtuse, nearly glabrous, 2–3-seeded. *Seeds* pilose.

** *Carpels not exceeding* 10.

9. **A. ramosum,** *Guill. & Perr. Fl. Seneg.* i. 68; leaves ovate-cordate acuminate, peduncles shorter than the petioles, sepals free for half their length, ripe carpels about 10 much exceeding the sepals, hispid, awns spreading. *Mast. in Oliv. Fl. Trop. Afr.* i. 186. A. sidoides, *Dalz. & Gibs. Bomb. Fl.* 18. Sida ramosa, *Cav. Diss.* i. 28, t. 6, f. 1.

NORTH-WEST PROVINCES; CONCAN, *Dalzell.*—DISTRIB. Tropical Africa.

Suffrutescent. *Branches* downy and with thin spreading hairs. *Leaves* long-petioled, sometimes 3-cuspidate, crenate-serrate. *Peduncles* axillary and terminal, trichotomous. *Calyx-tube* broadly cup-shaped. *Sepals* ovate, acute. *Petals* twice as long as the sepals.

10. **A. fruticosum,** *Guill. & Perr. Fl. Seneg.* i. 73; leaves ovate-cordate acute, stipules linear, carpels 10 truncate awnless pointed but little longer than the calyx. *Boiss. Fl. Orient.* i. 836; *Mast. in Oliv. Fl. Trop. Afr.* i. 187. A. microphyllum, *A. Rich. Fl. Abyss.* i. 70, t. 15. A. albidum, *Webb. & Berth. Phyt. Canar.* iii. 39, t. 2.? Sida amæna, *Wall. Cat.* 1848.

SINDH, *Stocks, Aitcheson;* IRRAWADDI? *Wallich.*—DISTRIB. Tropical Africa, Arabia, Java.

Suffrutescent, covered with white down. *Leaves* small, denticulate or nearly entire; petiole short. *Peduncles* solitary, axillary, shorter than the petiole, 1–3-flowered, pedicels jointed above the middle. *Sepals* ovate, acute, scarcely cuspidate, combined below into a shallow cup. *Fruit* cylindric, truncate, scarcely exceeding the calyx. *Seeds* sparingly pilose.—Dalzell says the flowers of this species expand at midday like the *Sidas.*

11. **A. neilgherrense,** *Munro in Wight. Ill.* t. 66; suffruticose, subglabrous, leaves whitish beneath roundish deeply peltate-cordate acuminate crenate; peduncles about the length of the petiole, corolla spreading, carpels truncate, twice the length of the sepals.

WESTERN PENINSULA, Nilghirrhis Mts., *Munro.*

Leaves sometimes 7½ in. *Peduncles* 2–10-flowered. *Sepals* lanceolate, acuminate, villous. *Petals* obovate, united below into a short tube, hairy at the orifice. *Tube* of the stamens glabrous. *Carpels* about 9.—I only know this species from Munro's description above cited.

In addition to the foregoing species, *A. auritum* (Sida aurita, *Wall. Cat.* 1860), a Javanese plant, is cultivated in India, and is sometimes met with as an escape from gardens.

5.* **MALACHRA,** Linn.

Herbs. *Leaves* angled. *Flowers* in dense heads, usually intermixed with bracteoles. *Sepals* 5, forming below the middle a cup-like tube. *Petals* 5, coherent below, and connate at the base with the tube of the stamens. *Staminal-tube* truncate or 5-toothed, filaments numerous. *Carpels* 5, 1-ovuled; styles 10. *Ripe carpels* 1-seeded, indehiscent, separating from the axis, smooth. *Seeds* reniform, ascending.—DISTRIB. Species 5 or 6, all American but the following, which is widely distributed throughout the tropics.

M. CAPITATA, *L.; DC. Prodr.* i. 440; leaves roundish-angled cordate toothed, bracteoles with a white spot at the base. *Mast. in Oliv. Fl. Trop. Afr.* i. 188.

Throughout the hotter parts of India from the North West provinces to the Carnatic, probably introduced.—DISTRIB. W. tropical Africa, tropical America.

Annual or perennial, coarsely hairy. *Leaves* 5–6 in. wide or less; petiole 4 in.; stipules linear. *Flowers* in axillary or terminal heads. *Petals* yellow or white, longer than the subulate sepals. *Fruit* subglobose, depressed.—It is singular that this plant is not mentioned either by Wight or Roxburgh, and that it is not included in Wall. Cat. In Wallich's herbarium, however, there are some specimens without numbers, and with no localities assigned, while others are from the Calcutta garden.

6. **URENA,** Linn.

Herbs or undershrubs, more or less covered with rigid stellate hairs. *Leaves* angled or lobed. *Flowers* clustered. *Bracteoles* 5, adnate to the 5-cleft calyx, sometimes coherent at the base into a cup. *Petals* 5, often tomentose at the back, free above, connate below and united to the base of the tube of the stamens. *Staminal-tube* truncate or minutely toothed. *Anthers* nearly sessile. *Ovary* 5-celled, cells 1-ovuled, opposite the petals; stigmatic branches 10; stigmas capitate. *Ripe carpels* covered with hooked bristles or smooth, indehiscent, separating from the axis when ripe. *Seed* ascending; cotyledons bent and folded; radicle inferior.—DISTRIB. Species 4–5, natives of tropical and subtropical countries; 2 only are confined to Asia.

* *Carpels armed with hooked bristles.*

1. **U. lobata,** *Linn.;* leaves rounded angled not divided beyond the middle. *DC. Prodr.* i. 441; *Roxb. Fl. Ind.* iii. 182; *W. & A. Prodr.* i. 46; *Wall. Cat.* 1928; *Dalz. & Gibs. Bomb. Fl.* 18; *Thwaites En.* 25; *Miq. Fl. Ind. Bat.* i. pt. 2, 148. U. cana, *Wall. Cat.* 1930 B. U. palmata, *Roxb. Fl. Ind.* iii. 182.

Generally distributed over the hotter parts of India.—DISTRIB. Tropics of both hemispheres.

Very variable, herbaceous, more or less hairy. *Leaves* about 1–2 by 2–3 in., cordate, 5–7-lobed, lobes acute or obtuse; nerves 5–7, prominent on the under surface, the three central, or the midrib only provided with a gland on the under surface; petiole usually shorter than the blade. *Bracteoles* oblong-lanceolate, equalling the calyx. *Flowers* pink. *Carpels* densely pubescent, echinate.

VAR 1. *scabriuscula,* DC. Prod. i. 441 (sp.); herbaceous, leaves roundish scarcely lobed with 1–3 glands beneath, bracteoles linear longer than the sepals.—U. scabriuscula, *Wall. Cat.* 1928 F; *W. & A. Prodr.* i. 46; *Dalz. & Gibs. Bomb. Fl.* 18.—Wight and Arnott doubt this being a distinct species, but Dalzell considers it very distinct.

2. **U. sinuata,** *Linn.; DC. Prodr.* i. 441; leaves divided below the middle into 5 oblong lobes narrowed at the base and often pinnatifid. *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 182; *Wall. Cat.* 1933 E; *W. & A. Prodr.* i. 46;

Thwaites Enum. 25; *Dalz. & Gibs. Bomb. Fl.* 18. U. muricata, *DC. Prodr.* i. 442. U. Lappago, *DC. Prodr.* i. 441. U. morifolia, *DC. Prodr.* i. 442? U. heterophylla, *Smith in Rees. Cycl.* 37; *Wall. Cat.* 1933 E, F, G, H, K. U. tomentosa, *Wall. Cat.* 1933 H;—*Burm. Zeyl.* t. 69, f. 2. *Rheede Hort. Mal.* t. x. f. 2; *Rumph. Amb.* vi. t. 25, f. 2.

Generally distributed over the hotter parts of India.—DISTRIB. Tropics of both hemispheres.

Very variable in amount of pubescence, and in the form of the foliage, herbaceous, perennial. *Leaves* downy, lobes serrated. *Glands* on under surface of nerves 1-3. *Bracteoles* linear-oblong, as long as the calyx. *Flowers* 1 in. diam. *Carpels* densely pubescent.

** *Carpels smooth, unarmed.*

3. **U. repanda,** *Roxb. Fl. Ind.* iii. 182; stellate-hairy, leaves roundish or somewhat lobed, flowers racemose, bracteoles 5 subulate connate below into a cup, sepals united for half their length. *W. & A. Prodr.* i. 46; *Wight Ill.* i. 65. U. rigida, *Wall. Cat.* 1929 (*partly*). U. Hamiltoniana, *Wall. Cat.* 2700. Pavonia repanda, *Spreng. Syst.* iii. 98. Urena speciosa, *Wall. Pl. As. Rar.* t. 26, *Cat.* 1931.

NORTH-WEST INDIA, UPPER GANGETIC PLAIN, the WESTERN PENINSULA and AVA.

Shrubby. *Leaves* shortly petioled, rough above, midrib glandular at the base beneath, lower 2–$2\frac{1}{2}$ in. long, roundish, rarely lobed, cordate at the base, repand-serrate, upper lanceolate. *Flowers* in ultimately leafless clusters. *Bracteoles* $\frac{1}{4}$–$\frac{1}{3}$ in.; subcoriaceous, exceeding the membranous calyx. *Corolla* pink, twice the length of the bracteoles. *Seed* ascending, smooth.

4. **U. rigida,** *Wall. Cat.* 1929 (*partly*); stellate-hairy, leaves cordate roundish, flowers in heads at the ends of the branches, bracteoles 5, lanceolate combined for half their length into a bell-shaped tube, sepals free nearly to the base.

BIRMA, *Wallich, M'Clelland;* MALACCA, *Griffith.*—DISTRIB. Borneo.

Perennial. *Stem* purplish, thinly stellate-hairy. *Leaves* petioled, about 2 by $2\frac{1}{4}$ in., base cordate, roundish serrulate, midrib glandular beneath; stipules setaceous. *Flowers* mixed with floral leaves, in terminal subsessile heads. *Sepals* $\frac{1}{4}$ in., nearly as long as the bracteoles, membranous, villous at the back. *Corolla* white, tubular at the base, above 5-petalous, twice the length of the bracteoles. *Stamen-tube* with 5 minute teeth at the upper edge. *Ripe carpels* hispid, reticulate. *Seed* pilose.—This species has the habit of a *Malachra.* The nearly free sepals are noteworthy.

7. PAVONIA, Cav.

Herbs or undershrubs. *Leaves* entire, angular or lobed, more or less downy. *Flowers* axillary or clustered at the ends of the branches. *Bracteoles* 5–∞, free or forming a tube at the base. *Calyx* 5-parted. *Corolla* 5-petalous, united at the base to the staminal-tube. *Staminal-tube* truncate or 5-toothed at the apex. *Ovary* 5-celled, cells usually opposite the sepals, rarely opposite the petals; styles 10, stigmas capitate, ovules 1 in each cell. *Ripe carpels* separating from the axis, entirely indehiscent, or more or less 2-valved, smooth, netted or winged, never glochidiate. *Seeds* ascending.—DISTRIB. Species about 60, chiefly tropical America.

SECT. 1. **Lebretonia.** *Bracteoles* 5–6. *Carpels* indehiscent.

1. **P. glechomifolia,** *A. Rich. Fl. Abyss.* i. 54; *Mast. in. Oliv. Fl. Trop. Afr.* i. 190. P. procumbens, *Boiss. Fl. Orient.* i. 837. Urena cordata,

Herb. Heyne. Lebretonia procumbens, *Wall. Cat.* 2688; *Wight Ic.* t. 4; *W. & A. Prodr.* i. 47. L. flava, *Wall. Cat.* 1883.—*Pluk.* t. 352, f. 5.

NORTH-WEST PROVINCES, SINDH, the WESTERN PENINSULA, BIRMA, and CEYLON.—DISTRIB. Trop. Africa, Arabia.

Rigid, procumbent, more or less pubescent. *Leaves* 2½ by 2 in., hirsute or glabrous, roundish-cordate, crenate-serrate, somewhat 3-lobed, midlobe longest; petiole 2 in. *Peduncle* slender, axillary, 1-flowered, about the length of the petiole. *Bracteoles* 5–6, ovate-lanceolate, exceeding the sepals. *Petals* yellow, longer than the bracteoles. *Ripe carpels* 5, muricate, sometimes with a serrulate crest.—Variable in pubescence, size of bracteoles and armature of carpels.

SECT. 2. **Eupavonia.** *Bracteoles* 10 or more. *Carpels* dehiscent.

2. **P. arabica,** *Hochst. in Schimp. Pl. Exsicc. Abyss.*; leaves nearly entire, carpels unarmed wingless. *Mast. in. Oliv. Fl. Trop. Afr.* i. 193; *Boiss. Fl. Orient.* i. 837.

SINDH, *Stocks.*—DISTRIB. Abyssinia.

Perennial, more or less densely clothed with down. *Stems* erect. *Leaves* 1½ by ½ in., subcordate, oblong, entire or slightly dentate; petiole as long as the leaf. *Peduncle* axillary, as long as the petiole. *Bracteoles* 10–12, linear, villous, exceeding the calyx and corolla. *Sepals* lanceolate. *Corolla* pink. *Carpels* 5, oblong, 3-sided.

3. **P. zeylanica,** *Cav.*; *DC. Prodr.* i. 444; glandular-pubescent, leaves hispid deeply 3–5-lobed, carpels unarmed slightly winged. *Roxb. Fl. Ind.* iii. 214; *Wall. Cat.* 1885 A *to* D; *W. & A. Prodr.* i. 47; *Dalz. & Gibs. Bomb. Fl.* 21; *Thwaites Enum.* 401. Hibiscus zeylanicus, *Linn.*; *Roxb. Hort. Beng.* 50.—*Pluk.* t. 125, f. 3; *Burm. Fl. Ind.* t. 48, f. 3.

NORTH-WEST PROVINCES, SINDH, the WESTERN PENINSULA and CEYLON.—DISTRIB. Trop. Africa, Mauritius.

Perennial, much branched, hispid. *Leaves* 1 by ¾ in. and upwards, cordate, roundish, deeply 3–5-lobed, lobes wedge-shaped, dentate, midlobe longest; petiole equalling or exceeding the blade. *Peduncles* about the length of the petiole, solitary, axillary. *Bracteoles* 8–12, linear, ciliolate. *Sepals* lanceolate. *Carpels* oblong, 3-sided.—Variable in the form and lobing of the leaf.

4. **P. odorata,** *Willd.*; *DC. Prodr.* i. 144; glandular-pubescent, leaves slightly 3–5-lobed, carpels unarmed wingless. *Roxb. Fl. Ind.* iii. 214; *Wall. Cat.* 1886, 1, 2, D, E; *W. & A. Prodr.* i. 47; *Thwaites Enum.* 26; *Mast. in Oliv. Fl. Trop. Afr.* i. 193. Hibiscus odoratus, *Roxb. Hort. Beng.* 50. P. sidoides, *Horn. in DC. Prodr.* i. 444; *Wall. Cat.* 1886 F, G. P. rosea, *Wall. Cat.* 1887; P. Romborua, *Wall. Cat.* 2690.

NORTH-WEST PROVINCES, SINDH and BANDA, *Edgeworth;* WESTERN PENINSULA, BIRMA and CEYLON.—DISTRIB. East Trop. Africa.

Erect, herbaceous, covered with sticky hairs. *Leaves* 2½ by 3 in., cordate-ovate, with 3–5 shallow pointed lobes; lower petioles longer than the blades. *Peduncles* as long as the leaves, 1-flowered, clustered at the ends of the branches. *Bracteoles* 10–12, linear. *Sepals* lanceolate. *Corolla* pink, twice the length of the calyx. *Carpels* obovoid.

5. **P. ceratocarpa,** *Dalzell in herb.*; stellate-hairy, leaves oblong irregularly toothed, carpels each with 3 terminal horns and 4 linear basal appendages.

SINDH, *Stocks.*

An undershrub. *Leaves* 1½–2 by 1 in., oblong, rounded at the base, obtuse, irregularly coarsely toothed; petiole ¾ in. *Peduncles* axillary and crowded at the end of the branches, jointed near the top. *Flowers* 1 in. diam. *Bracteoles* 10, linear, connate at the base. *Calyx* broadly campanulate, lobes deltoid. *Corolla* yellow, 2–3 times longer than the calyx. *Ovary* depressed *Carpels* 5, woody, pyriform, splitting through the back, 3-horned at the apex, and with 4 linear obtuse wing-like appendages at the base.—Leaves gratefully acid, as in *Oxalis*, Dalzell.

6. **P. propinqua,** *Garcke in Schweinf. Fl. Æthiop.* i. 55 ; suffrutescent, stellate-hairy, leaves oblong crenate, bracteoles 10 linear-lanceolate, carpels with 2 short prickles. *Mast. in Oliv. Fl. Trop. Afr.* i. 191. P. grewioides, *Hochst. Pl. Schimp. Exsicc. Abyss.* ; *Boiss. Fl. Orient.* i. 837.

SINDH, *Stocks.*—DISTRIB. Beluchistan, Abyssinia.

Leaves 1–4 in., subcordate ; petioles shorter than the leaves ; stipules linear-subulate. *Peduncles* solitary, axillary or clustered at the ends of the branches. *Bracteoles* nearly free, one-half longer than the ovate-lanceolate *sepals*. *Corolla* yellow, 1 in. diam., exceeding the bracteoles. *Fruit* subglobose, depressed ; carpels woody.

Under the name *Diplopenta*, Alefeld (in Œstr. Bot. Zeit. 1863, p. 11) describes a genus of *Malvaceæ*, which he says differs from *Pavonia* in the presence of 5 stigmatic branches instead of 10. To this genus he refers *Pavonia odorata*, Willd., and a new species, which he calls *D. pedunculosa*, and which, he says, has been confused with *P zeylanica*. I have seen no specimen of this genus, and suspect some error or accidental cohesion of styles.

8. DECASCHISTIA, W. & A.

Shrubs. *Leaves* entire or lobed. *Flowers* shortly peduncled, axillary or clustered and terminal. *Bracteoles* 10. *Sepals* 5, connate below. *Petals* 5, connate below and adnate to the tube of the stamens. *Staminal-tube* giving off many filaments below the apex. *Ovary* 10-celled, cells 1-ovuled ; styles 10, connate below, stigmas capitate. *Capsule* loculicidally 10-valved. *Seeds* reniform, ascending.—DISTRIB. The following are the only species.

1. **D. trilobata,** *Wight Ic.* t. 88 ; lower leaves deeply 3-lobed, bracteoles considerably shorter than the calyx. *Dalz. & Gibs. Bomb. Fl.* 21.

WESTERN PENINSULA ; Mysore, the Concan, and Dekkan.

A shrub, *branches* more or less hispid or tomentose. *Upper leaves* sometimes entire, lanceolate, lower more or less 3-lobed, lobes lanceolate or oblong-lanceolate, finely serrate ; petiole ¼ in., downy ; stipules linear or 3-lobed, equal to the petioles. *Peduncle* solitary, axillary, as long or longer than the petiole. *Flowers* 2 in. diam. *Bracteoles* linear. *Sepals* deltoid, connate below, twice the length of the bracteoles. *Capsule* hispid.

2. **D. crotonifolia,** *W. & A. Prodr.* i. 52 ; leaves simple rarely lobed coarsely toothed, bracteoles nearly as long as the calyx. *Wight Ic.* t. 42. Hibiscus crotonifolius, *Wall. Cat.* 1900 *and* 1901. H. pterospermoides, *Wight mss.* ; *Wall. Cat.* 1901 B. H. coriaceus, *Heyne mss.* ; *W. & A. l.c.*

WESTERN PENINSULA ; Mysore and Madura. UPPER GANGETIC PLAIN, *Royle.*

A shrub. *Leaves* 4 by 2 in., leathery, simple or slightly lobed, coarsely toothed, velvety on both surfaces with a short dense tomentum, whitish beneath, midrib with a glandular pore at the base ; petiole 1½ in. ; stipules linear-subulate. *Peduncle* longer than the petiole. *Bracteoles* nearly as long as the calyx. *Capsule* slightly hispid.

Among Maingay's specimens from Rangoon, is one (n. 213?) of which the flowers are too imperfect to allow of examination, but which is probably referable to this genus. *Leaves* 5 by 2 in., oblong-lanceolate. subcordate, sometimes 3-lobed at the apex, hoary-tomentose beneath ; petiole ½ in. *Peduncle* solitary, axillary, 1-flowered, as long as the petiole. *Bracteoles* 10, subulate-lanceolate, half the length of the calyx ; sepals lanceolate. *Corolla* pink, 4 in. diam.

9. **JULOSTYLES,** Thwaites.

A tree. *Leaves* shortly petioled, lanceolate, entire, puberulous. *Panicle* terminal, pendulous. *Bracteoles* 5, forming below a bell-shaped tube. *Sepals* 5, smaller than the bracteoles, connate below. *Petals* 5, connate below, exceeding the sepals. *Staminal-tube* antheriferous below the middle, 5-toothed above. *Ovary* 2-celled; styles 2, connate below and densely hairy, free at the apex, stigmas large, globose, woolly; ovules 2, collateral in each cell ascending. *Fruit* not seen.

1. **J. angustifolia,** *Thwaites Enum.* 30; *Beddome Fl. Sylvat. Anal. Gen.* t. iii. Kydia angustifolia, *Arn. Pug. Pl. Ind. Or.* 4 (322).

CEYLON; south of the island, not uncommon, *Thwaites.*

A low tree. *Leaves* 5–8 by 1½–3 in., paler beneath; petiole ¼–⅔ in. *Flowers* ½ in. diam. *Corolla* pale yellow with a reddish centre. *Pollen-grains* globose, muricate.

10. **DICELLOSTYLES,** Benth.

Trees, more or less covered with stellate down. *Leaves* simple or slightly lobed. *Inflorescence* panicled; bracteoles 4–6, lanceolate, connate at the base, longer than the calyx. *Sepals* 5, ovate, connate below the middle, internally provided at the base with a ring of fleshy tubercles. *Petals* oblong, unsymmetrical, connate at the base. *Filaments* many, connate at the very base. *Ovary* 2–4-celled; styles 2, connate below the middle, stigmas large globose; ovules 2 in each cell, collateral, ascending. *Capsule* globose, hispid, 8-lobed, splitting into 2 (or more) indehiscent cocci. *Seeds* solitary, reniform, albumen fleshy; cotyledons folded.—DISTRIB. So far as known, exclusively Indian.

1. **D. jujubifolia,** *Benth. in Gen. Pl.* i. 207; flowers panicled, bracteoles oblong-lanceolate. Kydia jujubifolia, *Griff. Notul.* iv. 534, *Ic. Pl. Asiat.* t. 595.

EASTERN TROPICAL HIMALAYA; Sikkim and Bhotan Mts., *Griffith,* &c.

A tree. *Leaves* 3 by 2 in., ovate-acute, or ovate-lanceolate, entire or obscurely lobed, rounded at the base, glabrous above, closely felted beneath, 5-nerved, nerves convergent; petiole ½ in., stellate-tomentose. *Inflorescence* panicled. *Mature flower* 1½ in. diam. *Bracteoles* oblong, many-ribbed. *Sepals* oblong, half the length of the bracteoles. *Petals* oblong, obtuse, oblique, nearly as long as the bracteoles. *Filaments* 25–30, free nearly to the base; anthers reniform. *Ovary* globose; style cylindric below, branched above.

2. **D. axillaris,** *Benth. l.c.*; flowers solitary axillary, bracteoles linear-oblong. *Beddome Flor. Sylvat. Anal. Gen.* t. 3; *Thwaites Enum.* 401. Kydia axillaris, *Thwaites Enum.* 30.

CEYLON; near Badulla, alt. 2000 ft., *Thwaites.*

A tree. *Leaves* 2½–4½ by 1¼–2 in., ovate-lanceolate, rounded at the base, paler beneath, feather-veined; petiole ¼–⅓ in.; stipules linear-lanceolate, 1-nerved, equalling the petiole. *Peduncle* about the length of the petiole. *Bracteoles* 1 by ¼–⅓ in. *Calyx* ½ in., cup-shaped, 5-toothed. *Stamens* connate at the base into a short tube, adherent to the petals. *Ovary* 2-celled; styles twice the length of the stamens, connate below the middle. *Fruit* hispid.

11. **SENRA,** Cav.

(By error Serræa, Serra, and Senræa.)

A downy undershrub. *Leaves* orbicular, 3-lobed. *Inflorescence* axillary. *Bracteoles* 3, large, membranous, free. *Sepals* 5, lanceolate, connate below.

Petals 5, combined below. *Staminal-tube* slightly 5-toothed, antheriferous below the summit. *Filaments* numerous. *Ovary* 5-celled, cells 2-ovuled; styles 5, stigma capitate. *Capsule* loculicidally 5-valved, valves opposite the sepals. *Seeds* reniform, ascending, 1 in each cell.

1. **S. incana,** *Cav. Diss.* ii. 83, t. 35, f. 3; *Boiss. Fl. Orient.* i. 838; *Mast. in Oliv. Fl. Trop. Afr.* i. 194. Serræa incana, *Decaisne in Ann. Sc. Nat. ser.* 2. iv. 70, t. 4; *Wight Ic.* t. 1592. S. rupestris, *Edgew. Cat. Band. Pl.* 44?; Dumreichera, *Hochst. in Schimp. Pl. Abyss. exsicc.*

SINDH, on rocks, *Stocks, Vicary*; ? BANDA, *Edgeworth*—DISTRIB. Arabia, Abyssinia, Nubia.

Leaves long-petioled, denticulate; stipules fugitive. *Peduncles* shorter than the petiole, ultimately deflexed. *Bracteoles* oval, cordate, membranous. *Calyx* bell-shaped. *Petals* obovate, yellow or violet, exceeding the calyx, shorter than the bracteoles. *Seeds* pilose and with black dots.—Varies in size of calyx and bracteoles.

12. **HIBISCUS,** Medik.

Herbs shrubs or trees. *Leaves* stipulate, usually more or less palmately-lobed. *Inflorescence* axillary. *Bracteoles* 5 or more, rarely fewer or 0, free, or connate at the base. *Calyx* 5-toothed or 5-fid, valvate, sometimes spathaceous and circumsciss. *Petals* 5, connate at the base with the staminal-tube. *Staminal-tube* truncate or 5-toothed at the summit; filaments many; anthers reniform, 1-celled. *Ovary* 5-celled, cells opposite the sepals, each with 3 or more ovules; styles 5, connate below, stigma capitate or subspathulate. *Capsule* loculicidally 5-valved, sometimes with a separate endocarp, or with false dissepiments forming a spuriously 10-celled fruit. *Seeds* glabrous, hairy or woolly.—DISTRIB. A genus of about 150 species, most abundant in the tropical regions of both hemispheres.

SECT. 1. **Trionum,** *Medik.* *Calyx* membranous, 5-cleft, ventricose.

1. **H. Trionum,** *L.*; *DC. Prodr.* i. 453; *Boiss. Fl. Orient.* i. 840. H. vesicarius, *Cav. Diss.* iii. 171, t. 64, f. 2; *W. & A. Prodr.* i. 48; *Dalz. & Gibs. Bomb. Fl.* 19. H. dissectus, *Wall. Cat.* 2696.

WESTERN HIMALAYA; Kashmir, Simla; BENGAL, CONCAN, SINDH.—DISTRIB. S. Europe and hotter parts of the Old World.

Annual, more or less pubescent. *Lower leaves* orbicular, undivided, upper 3–5-parted, lobes obovate-oblong, obtuse, toothed. *Bracteoles* numerous, linear. *Flowers* 1½ in. diam., yellow with a purple spot. *Calyx* with hispid green nerves. *Capsule* oblong, obtuse. *Seeds* glabrous.—Variable in pubescence, lobing of leaf, size of flower, &c.

SECT. 2. **Furcaria,** *DC.* *Calyx* persistent, 5-cleft. *Bracteoles* distinct, forked at the apex, or provided with a leafy appendage.

2. **H. surattensis,** *Linn.*; *DC. Prodr.* i. 449; stem with recurved prickles, stipules leafy broad ear-shaped. *W. & A. Prodr.* i. 48; *Roxb. Fl. Ind.* iii. 205; *Wight Ic.* t. 197; *Cav. Diss.* iii. t. 53, f. 1; *Thwaites Enum.* 26; *Wall. Cat.* 1893, 1, 2, 3, D, E, F, G; *Dalz. & Gibs. Bomb. Fl.* 20; *Mast. in Oliv. Fl. Trop. Afr.* i. 201; *Miq. Fl. Ind. Bat.* i. pt. 2, 161. H. furcatus, *Wall. Cat.* 1896 C, *not of Roxb.*—*Rheede Hort. Mal.* vi. t. 44.

HOTTER PARTS OF INDIA, from Bengal to Penang, and CEYLON.—DISTRIB. Tropical Asia, Africa, and Australia.

A weak-stemmed trailing plant, covered with soft hairs and scattered prickles. *Leaves* long-petioled, roundish, deeply and palmately 3–5-fid, lobes serrate. *Peduncle* equalling the petiole. *Bracteoles* linear, with a spathulate appendage. *Flowers* yellow, with a dark centre. *Capsule* hairy, ovoid. *Seeds* downy.

3. **H. furcatus,** *Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 204; shrubby, perennial or annual, prickly, leaves 3–5-lobed, stipules lanceolate, peduncles scattered. *DC. Prodr.* i. 449; *Wall. Cat.* 1896, 1, 2, A, B, D; *W. & A. Prodr.* i. 48; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 19; *Mast. in Oliv. Fl. Trop. Afr.* i. 201; *Miq. Fl. Ind. Bat.* i. pt. 2, 161. ? H. hispidissimus, *Griff. Notul.* iv. 52. H. aculeatus, *Roxb. Fl. Ind.* iii. 206. H. bifurcatus, *Roxb. ic. ined., not of Willd. or of Hort. Beng.*

HOTTER PARTS of INDIA, from BENGAL to CEYLON.—DISTRIB. Trop. and S. Africa, Asia, &c.

Stem erect, covered with soft down and with scattered slender recurved prickles, rising from a thickened coloured base. *Leaves* entire or 3-lobed, serrate, pubescent beneath, prickly along the nerves; stipules oblong-lanceolate. *Peduncles* short. *Bracteoles* 10–12, linear, forked. *Sepals* bristle-pointed. *Corolla* yellow with a crimson centre, 4 in. diam. *Capsule* ovoid, pointed, as long as the calyx.

4. **H. radiatus,** *Willd.*; *Roxb. Fl. Ind.* iii. 209; perennial, prickly, leaves deeply palmately divided, stipules linear, bracteoles 8–10 linear forked with or without an appendage. *Cav. Diss.* iii. 150, t. 54, f. 2; *DC. Prodr.* i. 449; *W. & A. Prodr.* i. 48; *Wall. Cat.* 1894 A, B; *Dalz. & Gibs. Bomb. Fl.* 20; *Miq. Fl. Ind. Bat.* i. pt. 2, 161. H. Lindleii, *Wall. Pl. As. Rar.* t. 4; *Wall. Cat.* 1895, 1, 2, C; *Bot. Reg.* 1395. H. heptaphyllus, *Dalz. & Gibs. Bomb. Fl.* 20.

KHASIA MTS., *Hk. f. & T.*; SIKKIM, *H. f.*; AVA and MARTABAN, *Wallich.*—DISTRIB. Java.

Suffrutescent. *Leaves* 4–5 by 1 in., 3–5-lobed, lobes broadly lanceolate, serrate; petiole armed, nearly as long as the blade. *Flowers* axillary, solitary, shortly peduncled. *Bracteoles* not glandular. *Sepals* 5, not glandular. *Corolla* yellow with a crimson centre, or all purple. *Fruit* not seen.—The leaves are said to have an acid taste.

SECT. 3. **Bombicella.** *Bracteoles* distinct, entire, without appendages. *Calyx* not distended. *Seeds* cottony or villous.

5. **H. hirtus,** *L.*; *W. & A. Prodr.* i. 51; shrubby, leaves ovate entire or slightly 3-lobed glandular beneath, peduncles as long as the leaves, corolla spreading. *Wight Ic.* t. 41; *Dalz. & Gibs. Bomb. Fl.* 20. H. phœniceus, *Willd.* (*excl. syn. Linn.*); *DC. Prodr.* i. 452, *partly*; *Roxb. Fl. Ind.* iii. 194; *Cav. Diss.* iii. t. 67, f. 2 (*excl. f*); *Wall. Cat.* 1904, B, C, D, E, F. H. rosa-malabarica, *Ker*, *Bot. Reg.* t. 337.—*Rheede Hort. Mal.* x. t. 1; *Pluk.* t. 254, f. 3.

NORTH-WEST PROVINCES, Peshawur, *Jacquemont, Stewart*; CONCAN, *Stocks*; WESTERN PENINSULA, often cultivated.—DISTRIB. Java, *Miq.*

Leaves 3 by 2 in., ovate, acuminate, lower often cordate and 3-lobed, serrate hairy, with a large gland on the under side of the midrib, serratures in the young leaves bristle-pointed; petiole 2 in., hairy; stipules linear, ½ in. *Peduncle* axillary, jointed below the flower. *Bracteoles* 5–7, subulate, shorter than the linear-lanceolate *sepals*. *Corolla* ½ in. diam., pink or white, spreading. *Anthers* whorled. *Capsule* globose, shorter than the calyx. *Seeds* cottony.

6. **H. micranthus,** *Linn.*; *Cav. Diss.* iii. t. 66, f. 1; scabrid, leaves ovate glandless, peduncles as long as or longer than the leaves, corolla reflexed. *DC. Prodr.* i. 453; *W. & A. Prodr.* i. 51, *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 20; *Mast. in Oliv. Fl. Trop. Afr.* i. 205. H. rigidus, *L. fil. Suppl.* 310; *Roxb. Fl. Ind.* iii. 195; *Wall. Cat.* 1905 B, C, D, E. H. clan-

destinus, *Cav. Ic.* i. t. 2. H. suborbiculatus, *Wall. Cat.* 1906. H. ovalifolius, *Vahl Symb.* i. 50; *Boiss. Fl. Orient.* i. 839.

Hotter parts of India, from the North West provinces eastward and southward to Ceylon.—Distrib. Tropical Africa, Arabia, &c.

Shrubby, with slender rod-like spreading branches, thinly covered with stellate bristles. *Leaves* ¾–1 in., ovate or oblong, quite entire or serrate, rough with bristly hairs; petiole very short. *Peduncles* axillary, as long or longer than the leaves. *Bracteoles* linear, shorter than the calyx. *Flowers* white or pink, ½ in. diam. *Sepals* lanceolate. *Corolla* reflexed. *Anthers* whorled. *Capsule* globose. *Seeds* cottony.—Variable; Roxburgh suspects that it may be specifically identical with *H. hirtus.* The green capsules of both are eaten by children. The form called *suborbiculatus* has roundish serrated leaves, but is otherwise not different.

7. **H. scindicus,** *Stocks in Hook. Ic. Plant.* t. 802; a hoary undershrub, leaves glandular, cuneate at the base, petals convolute. *Boiss. Flor. Orient.* i. 839.

Sindh, *Stocks.*—Distrib. Beluchistan.

A much branched tortuous and subspinous undershrub. *Leaves* subsessile, thinly bestrewn with stellate hairs, retuse, toothed; stipules subulate. *Peduncles* axillary, solitary, shorter than the leaves. *Bracteoles* 6–8, linear-subulate. *Sepals* linear-lanceolate, connate at the base, longer than the bracteoles. *Petals* longer than the calyx, twisted below into a tube. *Anthers* in a globose head. *Ovary cells* 2-ovuled. *Capsule* globose. *Seeds* with long wool.

8. **H. intermedius,** *A. Rich. Fl. Abyss.* i. 50; annual, with reflexed prickly hairs, leaves polymorphous glandless, peduncle shorter than the leaf. *Mast. in Oliv. Fl. Trop. Afr.* i. 198. H. scandens, *Dalz. & Gibs. Bomb. Fl.* 20.

Sindh, *Stocks;* coast of Kattywar, *Dalzell.*—Distrib. Arabia, East tropical Africa.

A weak-stemmed annual, with a line of hairs along one side of the branches shifting in position at each joint. *Leaves* entire or irregularly toothed, usually deeply 5–7-parted; lobes oblong, wedge-shaped at the base. *Peduncle* axillary, shorter than the petiole. *Bracteoles* strap-shaped, shorter than the calyx. *Flowers* 1 in. diam., yellow with a purple centre. *Sepals* lanceolate, 3-nerved, connate at the base. *Petals* twice the length of the calyx. *Capsule* beaked, hispid, valves slightly winged at the edges. *Seeds* black, covered with appressed shining hairs.

Sect. 4. **Lagunea,** *Cav. (gen.) Bracteoles* small or 0. *Seeds* pilose or smooth, not cottony.

9. **H. Solandra,** *L'Her. Stirp.* i. 103, t. 49; annual, herbaceous, leaves palmately lobed or entire, peduncles as long as the petioles, seeds tubercled. *Roxb. Fl. Ind.* iii. 197. *Mast. in Oliv. Fl. Trop. Afr.* i. 206. H. pumilus, *Roxb. Fl. Ind.* iii. 203. H. albus, *Wall. Cat.* 1876 E. Lagunea lobata, *Willd.; Cav. Diss.* v. t. 136; *DC. Prodr.* i. 474; *Wall. Cat.* 1876, A to D; *W. & A. Prodr.* i. 55; *Thwaites Enum.* 27; *Dalz. & Gibs. Bomb. Fl.* 21. Sida heterophylla *and* S. diversifolia, *Spreng. ex W. & A. Prodr.* i. 56, *and in Herb. Heyne.* Solandra lobata, *Murr. Comm. Goett.* vi. t. 11; *Cav. Diss.* i. *Mantissa,* i. 55; *Lam. Ill.* t. 580. Triguera acerifolia, *Cav. Diss.* i. t. 11. Lagunea sileniflora, *Wall. Cat.* 1882.

Hotter parts of India, from the N. W. provinces to Sikkim and from Kumaon and Birma to Ceylon.—Distrib. East tropical Africa.

Erect, slightly villous. Lower *leaves* on long petioles, upper palmately lobed, uppermost 3-fid. *Peduncles* 1½ in., 1-flowered, jointed near the top, arranged in a terminal loose leafless raceme. *Bracteoles* linear, usually 0. *Flower* yellow, ¾ in. diam. *Sepals* lanceolate, 3-nerved, connate at the base, as long as the ovoid beaked capsule. *Seeds* blackish.

SECT. 5. **Ketmia,** *DC.* *Bracteoles* entire, free or connate at the base, sometimes adnate to the calyx-tube. *Calyx* 5-cleft, not ventricose. *Seeds* hairy, not cottony.

* *Bracteoles* 5, *free or connate at the base, not adnate to the calyx.*

10. **H. fragrans,** *Roxb. Fl. Ind.* iii. 195; arborescent, glabrescent, leaves cordate-ovate acuminate, flowers axillary and terminal, peduncle shorter than the leaf, bracteoles ovate connate below. *Wall. Cat.* 1911 A.

SILHET, *Roxburgh;* CACHAR, *Hk. f. & T.;* ASSAM.

A small tree. *Young leaves* 3–4 by 3 in., pubescent, serrate; petiole 2½ in. *Peduncles* axillary, panicled, 2–3 in., jointed near the top. *Sepals* 5, ovate-lanceolate, connate below, longer than the bracteoles. *Corolla* 2½ in. diam., white, fragrant. *Capsule* 1 in., cylindric, downy, longer than the persistent calyx. *Seeds* covered with long white hairs.

11. **H. canescens,** *Heyne in Wall. Cat.* 2698; shrubby, leaves acutely lobed, upper simple tomentose beneath, peduncles axillary shorter than the petiole, bracteoles linear-subulate longer than the calyx. *W. & A. Prodr.* i. 49; H. septemnervosus, *Wight in Wall. Cat.* 2693. H. borbonicus, *Wight in Wall. Cat.* 2694, *not of Link.*

WESTERN PENINSULA; Mysore, and the Carnatic.

Stem not prickly. *Leaves* 3½ by 3 in., roundish, cordate, minutely toothed, 7-nerved; petiole 3 in. *Stipule* 1 in., setaceous. *Peduncle* ⅝ in., angular. *Bracteoles* 1 in., striated. *Sepals* ovate, acute, 3-nerved. *Corolla* yellow with a pink centre. *Capsule* 1½ in., twice the length of the calyx, oblong, pointed, villous. *Seeds* downy.

12. **H. scandens,** *Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 200; (*not of Wall.*); scandent, pubescent, leaves cordate-ovate sometimes lobed, flowers numerous in terminal panicles, bracteoles ovate acute connate below the middle. *Wall Cat.* 1910, 1910 B.

TROPICAL EASTERN HIMALAYA and EASTERN BENGAL, from Sikkim to Chittagong.

A shrub climbing over lofty trees. *Young shoots* thinly stellate-tomentose. *Leaves* 3–8 by 2–5 in., ovate-acuminate, dentate, sometimes 3-angled or 3-lobed, lobes deltoid-lanceolate; petiole 1 in. pilose. *Stipules* linear-lanceolate, deciduous. *Peduncles* 1 in.; flower-buds globose. *Flowers* 1¼ in. diam. *Sepals* oblong-lanceolate, slightly exceeding the bracteoles. *Corolla* twice the size of the calyx, white or yellow with a crimson centre. *Fruit* not seen.

** *Bracteoles more than* 5, *free or connate at the base, not adnate to the calyx.*

13. **H. macrophyllus,** *Roxb. Hort. Beng.* 51; arborescent or shrubby, villous, leaves entire orbicular cordate rarely lobed hispid, bracteoles large spathaceous deciduous, flowers in terminal cymes. *Wall. Pl. As. Rar.* i. 44, t. 51, *Wall. Cat.* 1903. H. setosus, *Roxb. Fl. Ind.* iii. 194. H. vestitus, *Griff. Notul.* iv. 519.

EASTERN BENGAL and the EASTERN PENINSULA, from Silhet and Chittagong to Mergui and Penang.

A tree or shrub more or less covered with brown, villous, often tufted hairs. *Leaves* large, 7–9-nerved, very hairy on the lower surface; petiole 7–8 in., longer than the blade. *Stipules* large, oblong, foliaceous, deciduous. *Inflorescence* terminal, many-flowered, cymose; pedicels 1½–2 in., shaggy like the petioles with brown hairs, articulated at the top and provided at the joint with two large spathaceous caducous bracts connate below. *Bracteoles* 10–12, linear, 1 in., connate at the very base, equalling the calyx. *Sepals* 5, lanceolate, connate below the middle into a bell-shaped 10-ribbed tube. *Corolla* 4 in. diam., purple. *Capsule* oblong, pointed, hispid, as long as the persistent calyx. *Seeds* densely bearded with long silky fulvous hairs.

14. **H. collinus,** *Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 198; arborescent, leaves lobed, peduncles axillary shorter than the leaves, bracteoles 8–10 oblong wavy free. *Wall. Cat.* 1908 E. H. æstuans, *Wall. Cat.* 1908 B. H. asperatus, *Wall. Cat.* 1908 C. H. acerifolius, *DC. Prodr.* i. 448. H. eriocarpus, *DC. Prodr.* i. 452; *W. & A. Prodr.* i. 51; *Thwaites Enum.* 26. Hibiscus simplex, *Roxb. Hort. Beng.* 51; *G. Don, Gen. Syst.* i. 480; *W. & A. Prodr.* i. 51. Pavonia acerifolia, *Lk. & Otto. Ic. Pl. Select.* x. t. 1.

WESTERN PENINSULA; in the Concan, Circars, and Coromandel; CEYLON.

Stem without prickles. *Leaves* 4 in., glabrous or thinly hairy, cordate, 3-lobed; lobes oblong, narrowed at the base, acuminate, margin wavy; petiole 2 in. *Stipules* setaceous. *Peduncle* 2 in. *Bracteole* ¾ in., nearly equal to the calyx. *Sepals* oblong, lanceolate, 1 nerved. *Corolla* 2–3 in. diam., pink with a dark centre; claw of petal hairy. *Staminal-tube* antheriferous all the way down; anthers whorled. *Capsule* ½ in., orbicular, depressed, densely hispid. *Seeds* spherical, glabrescent.

15. **H. lunariifolius,** *Willd.*; *DC. Prodr.* i. 451; herbaceous, perennial, clothed with appressed hairs, leaves angled or lobed, peduncles very short forming a terminal leafless raceme, bracteoles 5–10 lanceolate connate at the base. *W. & A. Prodr.* i. 49; *Wight Ic.* t. 6; *Thwaites Enum.* 401; *Mast. in Oliv. Fl. Trop. Afr.* i. 202; *Miq. Fl. Ind. Bat.* i. pt. 2, 159. H. pruriens, *Roxb. Hort. Beng.* 51; *Fl. Ind.* iii. 196; *Wall. Cat.* 1892; *DC. Prodr.* i. 448. H. racemosus, *Lindl. Bot. Reg.* t. 917. H. sidoides, *W. & A. Prodr.* i. 494.

WESTERN PENINSULA, in the Carnatic and Mysore; BIRMA, *Wallich;* CEYLON.—DISTRIB. Tropical Africa.

Stem covered with rigid pungent hairs. *Leaves* about 3 in. diam., roundish-cordate, slightly and acutely 3–5-lobed, serrate, hairy beneath; petiole as long or longer than the blade. *Stipules* subulate. *Peduncles* thickened below the flower, very hairy. *Flowers* 4 in. diam., yellow, with a dark centre. *Bracteoles* longer than the calyx. *Sepals* linear. *Corolla* convolute. *Staminal-tube* antheriferous all the way down. *Capsule* ovoid, beaked, clothed with pungent hairs. *Seeds* kidney-shaped.

16. **H. panduræformis,** *Burm. Fl. Ind.* 151, t. 47, f. 2; annual or perennial, without prickles, densely clothed with sticky hairs, leaves cordate angular tomentose, peduncles very short, bracteoles 7–10 linear-spathulate, free. *W. & A. Prodr.* i. 50; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 20. H. tubulosus, *Cav. Diss.* iii. 161, t. 68, f. 2; *Roxb. Hort. Beng.* 51; *Fl. Ind.* iii. 196; *DC. Prodr.* i. 447; *Wall. Cat.* 1902 E, G; *Miq. Fl. Ind. Bat.* i. pt. 2, 157. H. setosus, *Wall. Cat.* 1902 (*not of Roxb.*). H. velutinus, *DC. Prodr.* i. 452.

Hotter parts of India, from the NORTH-WEST PROVINCES to BIRMA and CEYLON.—DISTRIB. Tropical Africa and Australia.

Leaves tomentose, hispid, whitish beneath, slightly 5-lobed, upper narrow; petiole about 2 in., shorter than the blade. *Stipules* linear, divided, deciduous. *Peduncles* ¾ in., axillary or clustered at the ends of the branches. *Bracteoles* shorter than the calyx. *Sepals* lanceolate, connate below into a cup-shaped tube. *Petals* yellow with a purple centre or all purple. *Filaments* few. *Capsule* ovoid, very hairy. *Seeds* pubescent or glabrous.

17. **H. vitifolius,** *L.*; *DC. Prodr.* i. 450; annual or biennial, villous, leaves 3–5-lobed, bracteoles 8–12 free, capsule 5-winged. *Roxb. Fl. Ind.* iii. 200; *Wall. Cat.* 1899, 1, 2, 3, *and* E, F, G; *Cav. Diss.* iii. 145, t. 58, f. 2; *W. & A. Prodr.* i. 50; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 20; *Miq. Fl. Ind. Bat.* i. pt. 2, 160. H. obtusifolius, *Willd.*; *DC. Prodr. l. c.*; *Wall. Cat.* 1899 D. H. truncatus, *Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 200. H. serratus, *Wall. Cat.* 1900, 1, 2. H. cuspidatus, *Edgew. Cat. Banda Pl.* 44.—*Rheede Hort. Mal.* vi. t. 46,

Hotter parts of India, from the NORTH-WEST PROVINCES to CEYLON.—DISTRIB. Tropical Africa and Australia.

Herbaceous. *Leaves* tomentose on both sides, cordate, roundish or angled, 3–5-lobed, lobes oblong lanceolate, coarsely serrate, lower 4 in.; petiole 2½ in. *Peduncles* solitary, axillary, 1-flowered, shorter than the petiole, jointed in the middle, often aggregated at the ends of the branches. *Bracteoles* linear, shorter than the bell-shaped 5-cleft calyx. *Sepals* lanceolate, 3–5-nerved, connate below the middle. *Petals* yellow with a purple spot, twice or thrice longer than the sepals. *Anthers* regularly arranged along the whole length of the staminal tube. *Capsule* beaked, hairy, shorter than the calyx, valves winged at the edge. *Seeds* tubercled.—*H. truncatus*, Roxb., is a variety with much smaller parts.

18. **H. procerus,** *Wall. Cat.* 2692; perennial, prickly, leaves glabrous deeply 5–7-parted, bracteoles 8–10 free linear covered with tawny tomentum, sepals lanceolate bristly, corolla large.

BIRMA, *Wallich.*

Prickles of stem conical, with a whitish base. *Leaves* 8 by 5 in., roundish, deeply 3–7–9-parted, lobes lanceolate, serrate, glabrous, midrib prickly, upper leaves 3-parted, uppermost lanceolate; petiole 1–2 in., lower 4 in. *Stipules* ½ in., linear, pilose. *Peduncles* ½ in., aggregated at the ends of the branches and with the bracteoles and calyx clothed with tawny tomentum. *Sepals* ½ in. *Corolla* 6 in. diam., pink with a dark centre. *Capsule* ovoid, pointed, shorter than the sepals. *Seeds* black, tubercled.

19. **H. cannabinus,** *L.; DC. Prodr.* i. 450; annual or perennial, prickly, stem glabrous, lower leaves entire upper lobed, mid-nerve glandular beneath, peduncle very short, bracteoles 7–10 linear, shorter than the calyx, sepals glandular. *Cav. Diss.* iii. 148, t. 52. f. 1; *Roxb. Fl. Ind.* iii. 208; *Cor. Pl.* i. t. 190; *Wall. Cat.* 1898 ?; *W. & A. Prodr.* i. 50; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 20. H. Wightianus, *Wall. Cat.* 2695 and 1898.

Generally cultivated; apparently wild East of the Northern Ghauts.—DISTRIB. Cultivated in most tropical countries.

Stem glabrous, prickly. *Lower leaves* cordate, upper deeply palmately lobed, lobes narrow, serrate; petiole prickly, lower much longer than the blade. *Stipules* linear, pointed. *Peduncles* axillary, very short. *Sepals* bristly, lanceolate, connate below the middle, with a gland at the back of each. *Corolla* large, spreading, yellow with a crimson centre. *Capsule* globose, pointed, bristly. *Seeds* nearly glabrous.—All parts agreeably acid. The stems furnish fibre.—The specimen of *H. Wightianus* in Wallich's herbarium is imperfect, but it is doubtless referable to this species; its leaves are simple.

20. **H. diversifolius,** *Jacq. Ic. Pl. Rar.* t. 551; perennial, stem pubescent covered with short stout conical prickles, leaves long-petioled scabrous roundish or angular 3–5-lobed, bracteoles 10 linear very bristly half the length of the calyx. *Roxb. Fl. Ind.* iii. 208; *DC. Prodr.* i. 449 ?; *Bot. Reg.* t. 381; *Mast. in Oliv. Fl. Trop. Afr.* i. 198. H. scaber, *Wall. Cat.* 1894 C, *and* 1897, 18982.

BIRMA, *Wallich.*—DISTRIB. Tropical Africa and Australia.

A tall herb or undershrub, with the branches, petioles and nerves of leaves armed with hard conical prickles. *Leaves* variable, usually cordate, roundish, slightly lobed, lobes acute, upper nearly entire, lanceolate. *Peduncles* very short bristly, axillary, racemose. *Sepals* linear-lanceolate, bristly not glandular. *Corolla* 3 or 4 times the size of the calyx. *Capsule* ovoid, pointed, hispid, ultimately glabrescent. *Seeds* smooth.—The specimens from Birma do not materially differ from those grown in the Calcutta garden. I refer to De Candolle's plant with doubt, as he gives as a synonym *H. ficulneus* of Cav., quite a different plant.

21. **H. Gibsoni,** *Stocks mss.;* an undershrub, branches bristly or with minute prickles, leaves deeply palmately divided, peduncle longer than the

leaves, bracteoles free linear prickly curving over the calyx. H. pentaphyllus, *F. Muell. Fragm. Phyt. Aust.* ix. 13; *Mast. in Oliv. Flor. Trop. Afr.* i. 198 (*not of Roxb.*).

The PANJAB, DECCAN, CONCAN, and SINDH, *Stocks*, &c.—DISTRIB. Affghanistan, South tropical Africa, North Australia.

Leaves 1–3 in., oblong-lanceolate, serrate, glabrous or with numerous forked hairs; petiole as long as the blade. *Peduncles* solitary, axillary. *Bracteoles* longer than the calyx. *Sepals* lanceolate, 5-nerved, connate below into a bell-shaped tube. *Corolla* twice the length of the bracts, yellow with a purple centre, or all purple. *Staminal-tube* half covered with anthers. *Capsule* ovoid, pointed; valves setose. *Seeds* pilose.

22. **H. punctatus,** *Dalzell in Dalz. & Gibs. Bomb. Fl.* 20 (1861); annual, stellately pubescent and glutinous, leaves ovate more or less 3-lobed, peduncle as long as the petiole, bracteoles 8–10 linear, shorter than the calyx connate at the base, petals scarcely exceeding the sepals. H. laguneoides, *Edgew. in Journ. Linn. Soc.* vi. 199 (1862).

SINDH, *Stocks;* MOOLTAN, *Edgeworth.*

A lax branching annual. *Leaves* distant, rounded ovate, acute, entire or 3-lobed, lobes oblong, sinuate-dentate; petiole 1¾ in., shorter than the blades. *Stipules* minute, subulate. *Peduncles* 1–2 in., sub-panicled, jointed at the top. *Calyx* bell-shaped; sepals deltoid, lanceolate, connate below the middle. *Petals* rose-coloured. *Capsule* beaked, pilose, as long as the calyx. *Seeds* tubercled, black.—Yields good hemp (*Dalzell*).

*** *Bracteoles adnate to the base of the calyx.*

23. **H. Sabdariffa,** *L.; DC. Prodr.* i. 453; annual, glabrous, unarmed, stem purplish, leaves entire or lobed glandular beneath, peduncles very short thickened at the summit, bracteoles 8–12 linear adnate to the base of the calyx, sepals bristly. *W. & A. Prodr.* i. 52; *Miq. Fl. Ind. Bat.* i. pt. 2, 158; *Wall. Cat.* 1909; *Cav. Diss.* iii. p. 170; vi. 351, t. 198, f. 1. ? H. sanguineus, *Griff. Not.* iv. 520.

Generally cultivated in the hotter parts of India, and in CEYLON.—DISTRIB. Cultivated in the Tropics.

Erect. *Leaves* polymorphous, midrib glandular beneath; petiole 2 in. *Peduncle* solitary, axillary, shorter than the petiole. *Bracteoles* and *calyx* accrescent. *Sepals* deltoid, acuminate, connate below the middle into a purplish fleshy cup. *Corolla* 2½ in. diam., yellow. *Capsule* ovoid, pointed, villous, shorter than the calyx. *Seeds* reniform, sub-glabrous.—The Rozelle of India, and Red Sorrell of the W. Indies.

SECT. 6. **Abelmoschus.** *Calyx* elongate, spathaceous, circumsciss.

* *Bracteoles* 4–6, *broad, leafy.*

24. **H. ficulneus,** *L.; DC. Prodr.* i. 448; annual, prickly, leaves palmately 3–5-lobed lobes glabrous narrowed at the base, bracteoles 5–6 lanceolate villous fugacious, capsule ovoid. *Wall. Cat.* 2697 B. H. prostratus, *Roxb. Fl. Ind.* iii. 208. H. strictus, *Roxb. Hort. Beng.* 52; *Flor. Ind.* iii. 206. H. sinuatus, *Cav. Diss.* iii. t. 52, f. 2. Abelmoschus ficulneus, *W. & A. Prodr.* i. 53; *Wight Ic.* t. 154; *Thwaites Enum.* 27; *Miq. Fl. Ind. Bat.* i. pt. 2, 152. Lagunea aculeata, *Cav. Diss.* iii. t. 71, f. 1; *DC. Prodr.* i. 474.

Hotter parts of India, from the NORTH-WEST PROVINCES and PANJAB to BENGAL, the CIRCARS, and CONCAN ("Native of the southern provinces of the Peninsula, naturalized elsewhere, *W. & A. l.c.*").

Branches shining, covered with small sharp tubercles. *Young leaves* rounded-cordate, adult hispid, palmately lobed with wide sinuses, lobes unequally toothed; petiole 2½–4 in., as long as the leaves. *Stipules* subulate, lanceolate, caducous. *Peduncles* half the length of the petioles, the upper in a leafless raceme. *Sepals* 5, hispid, connate for almost their whole length. *Corolla* 1 in. diam., white with a rosy centre. *Anthers* equally distributed. *Capsule* tomentose, covered with viscid points when green. *Seeds* globose, sulcate, slightly pilose.—Roxburgh calls special attention to the excellence of the fibre of this plant. His *H. prostratus* is a form with procumbent branches.

25. **H. pungens,** *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 213; annual or perennial, bristly, petiole longer than the deeply-lobed leaves, lobes oblong acuminate toothed, bracteoles 4–5 persistent oblong-lanceolate acuminate, as long as the cuspidate hispid capsule. H. vestitus, *Wall. Cat.* 1924 *partly.* Bamia pungens, *Wall. Cat.* 1924.

Tropical Himalaya, from Kumaon to Sikkim, alt. 2–5000 ft.; Khasia Mts.

Stem erect, branches ascending, bristly and with scattered black dots. *Leaves* 5–8 in., cordate roundish, deeply palmately 7-lobed, lobes oblong acuminate, toothed, upper ones 3-lobed; petiole 8–10 in. *Stipules* broad lanceolate, upper linear-setaceous. *Peduncles* 1–2 in., racemose. *Bracteoles* 1 in., accrescent. *Calyx* 5-toothed. *Corolla* yellow with a purple centre, 5 in. diam. *Column* antheriferous throughout. *Capsule* ¾ in.

H. Manihot *L.*; *DC. Prodr.* i. 448; annual, subglabrous, leaves deeply palmately-lobed, lobes linear-oblong coarsely toothed or lobulate, peduncles deflexed, bracteoles 4–6 persistent ovate-lanceolate. *Wall. Cat.* 1926; *Cav. Diss.* iii. 172, t. 63, f. 2. H. pentaphyllus, *Roxb. Hort. Beng.* 52; *Flor. Ind.* iii. 212 (*not of F. Muell*).

Naturalized in Bengal; introduced from China.

A tall almost glabrous herb. *Leaves* 5–6 by 6–7 in.; petiole nearly as long as the blade. *Stipules* lanceolate. *Peduncles* 1½ in., ultimately drooping. *Flowers* 5 in. diam., yellow with a purple centre. *Staminal-tube* antheriferous all the way down. *Capsule* oblong, pointed, hispid (5-seeded, *Roxb.*).

26. **H. tetraphyllus,** *Roxb. Hort. Beng.* 52; *Fl. Ind.* iii. 211; annual hispid and slightly prickly, leaves cordate very deeply 5–7-lobed lobes lanceolate crenate-toothed, bracteoles persistent broadly ovate lanceolate equalling the cuspidate capsule. H. canaranus, *Miq. Pl. Hohenack exsicc.* Bamia tetraphylla, *Wall. Cat.* 1925. Abelmoschus tetraphyllus, *Grah. Cat. Bomb.* 14. A. Warreensis, *Dalz. in Hook. Kew Journ. Bot.* iii. 123; *Dalz. & Gibs. Bomb. Fl.* 19. Erebennus canaranus, *Alefeld in Œst. Bot. Zeit.* 1863, 14.

Bengal, near Calcutta, *Roxburgh*; Concan, and Canara, *Gibson*, &c.

Stem 4–6 ft. *Leaves* scabrous; petiole 2½ in. *Stipules* ovate-lanceolate. *Peduncles* 1 in., axillary, and clustered at the ends of the branches. *Bracteoles* ½–¾ in., shorter than the calyx. *Flowers* 2 in. diam., yellow. *Capsule* ovate, 5-angled, hispid, 1½ in. *Seeds* smooth.—Dalzell, l.c., says his *A. Warreensis* differs from *A. tetraphyllus* in the persistent not deciduous bracteoles, but in most of the specimens the bracteoles are persistent. There is great variation in foliage and pubescence.

27. **H. angulosus,** *Mast.*; herbaceous, not prickly, leaf-lobes ovate acuminate, bracteoles fugacious, capsule ovoid pointed hispid as long as the calyx. Abelmoschus angulosus, *W. & A. Prodr.* i. 53; *Wight. Ic.* t. 951; *Ill.* i. 65; *Thwaites Enum.* 26. Bamia angulosa, *Wall. Cat.* 1927; Hymenocalyx variabilis, *Zenker ex Wight, Ill.* p. 65.

Western Peninsula; Concan, Malabar, and Nilghirris Mts.; Ceylon.

Leaves about 4 in., pubescent above, tomentose below, cordate, palmately 5-lobed; petiole 5–6 in. *Peduncles* not exceeding the petiole, densely hispid, hairs spreading. *Bracteoles* ovate. *Calyx* 1½ in., ovate-lanceolate, hispid; sepals slightly cohering. *Corolla* 5 in. diam.

Var. 1. *grandiflorus*, Thwaites Enum. 26; petioles scabrous not hispid, corolla yellow, seeds subpyriform.

Var. 2. *purpureus*, Thwaites, l.c.; petiole covered with rigid spreading hairs, corolla purple, seeds globose.

28. **H. hostilis,** *Wall. ms.;* annual, bristly, leaves large cordate angular palmately 5-lobed lobes dentate, bracteoles 5–6 ovate-lanceolate, capsule oblong-lanceolate setose. Bamia magnifica, *Wall. Cat.* 1919.

Birma, *Wallich.*

Erect, *stem* glabrescent. *Leaves* 10 by 8 in., lobes acute; petioles of lower leaves 10 in. *Stipules* ovate-lanceolate. *Peduncle* 2 in., dilated at apex. *Bracteoles* $\frac{1}{2}$ as long as the capsule, shorter than the calyx. *Flowers* 6–8 in. diam. *Capsule* 2 in. long, cuspidate.

** *Bracteoles generally more than* 5, *linear.*

29. **H. Abelmoschus,** *L.; DC. Prodr.* i. 452; annual, hispid, leaves polymorphous base cordate hastate or sagittate with acute lobes, peduncles as long as the petioles, bracteoles 6–12 linear much shorter than the oblong-lanceolate setose glabrescent capsule. *Roxb. Fl. Ind.* iii. 202; *Griff. Not.* iv. 521. Abelmoschus moschatus, *Mœnch; W. & A. Prod.* i. 53; *Wight. Ic.* t. 399; *Wall. Cat.* 1915, F, G, H, I, K, L; *Thwaites Enum.* 27; *Miq. Fl. Ind. Bat.* i. pt. 2, 151. H. flavescens, *Cav. Diss.* iii. t. 70, f. 2; *DC. l.c.* 454. H. spathaceus, *Wall. Cat.* 1913, 1913 A, 1915. H. ricinifolius, *Wall. Cat.* 1915. H. chinensis, *Wall. Cat.* 1616? H. sagittifolius, *Kurz. in Journ. As. Soc. Beng.* 1871, ii. p. 46—*Rheede Hort. Mal.* ii. t. 38.

Through the hotter parts of India.—Distrib. Cultivated in most tropical countries.

Herbaceous, 2–3 ft. high. *Leaves* usually palmately 5–7-lobed, lobes spreading, oblong-lanceolate, acuminate, coarsely toothed. *Stipules* linear. *Peduncles* 2 in., equalling the petiole. *Bracteoles* $\frac{1}{2}$–$\frac{3}{4}$ in. *Calyx* $1\frac{1}{4}$ in., oblong, 15-toothed. *Corolla* 4 in. diam., yellow with a crimson centre. *Capsule* 1–3 in. *Seeds* reniform, striate, musky.—Very variable. The following forms may be distinguished:—

Var. 1. *multiformis*, Bamia Sp. Wall. Cat. 1917; lower leaves roundish-cordate, upper oblong-sagittate, uppermost linear-lanceolate. Birma.

Var. 2. *betulifolius*, Bamia Sp. Wall. Cat. 1918; leaves orbicular-cordate, bracteoles longer than in the type.

30. **H. rugosus,** *Mast.;* annual, hispid, bristly, leaves cordate or hastate 5-lobed lobes lanceolate serrate, peduncles racemose, bracteoles 10 setaceous, capsule ovoid hairy. H. hirtus, *Buch. ex Roxb. Fl. Ind.* iii. 203, *not of others.* Bamia rugosa, *Wall. Cat.* 1923. Abelmoschus rugosus, *W. & A. Prodr.* i. 53.

Mysore, *Hamilton;* Madura hills, *Wight.*

Stem erect, hispid not aculeate. *Leaves* polymorphous, lower lobed, upper lanceolate, nearly entire; petiole nearly as long as the leaves. *Stipules* subulate. *Bracteoles* half the length of the capsule. *Flowers* yellow with a red centre. *Capsule* 1 in., ovoid, 5-angled, hairy. *Seeds* numerous.—Perhaps not distinct from *H. Abelmoschus.*

31. **H. cancellatus,** *Roxb. Hort. Beng.* 51; *Fl. Ind.* iii. 201; annual, erect, very bristly, leaves cordate angled crenate, bracteoles 10–15 long filiform incurved hispid. Abelmoschus (Bamia) crinitus, *Wall. Pl. As. Rar.* i. 39, t. 44. A. racemosus, *Wall. Cat.* 1929 (*not H.* racemosus *of Lindley*). Bamia cancellata *and* B. fusiformis, *Wall. Cat.* 1920, 1921.

North-West provinces, *Falconer;* Kumaon, ascending to 4000 ft.; Nepal, *Hamilton;* Pegu.

Root fusiform. *Stem* herbaceous, 2–3 ft. *Leaves* 4–6 by 3–5 in., cordate, roundish, obtusely 5-angled, crenate-toothed, sometimes lobed, upper sagittate; petiole 4 in. *Stipules* linear. *Peduncles* much shorter than the petiole, racemose at the ends of the branches, each with 2 bracts at the base. *Bracteoles* linear-setaceous, $1\frac{1}{2}$ in. *Flowers*

4–5 in. diam., yellow with a purple centre. *Anthers* scattered. *Capsule* 1½ in., ovoid, furrowed. *Seeds* numerous, reniform.—The form called *fusiformis* has more deeply divided leaves than the type.

H. ESCULENTUS, *L.; DC. Prodr.* i. 450; annual, hairy, not prickly, leaves cordate 3–5-lobed lobes oblong toothed scabrous, peduncle shorter than the petiole, bracteoles 8–10 deciduous equalling the calyx, capsule pyramidal. *Cav. Diss.* iii., t. 61, f. 2. H. longifolius, *Roxb. Fl. Ind.* iii. 210; *Wall. Cat.* 2699; *DC. Prodr.* i. 450. Abelmoschus esculentus, *W. & A. Prodr.* i. 53; *Miq. Fl. Ind. Bat.* i. pt. 2, 152.

Cultivated throughout India, probably originally native.—DISTRIB. Naturalized or cultivated in all tropical countries.

A tall herb covered with rough hairs. *Leaves* coarsely toothed; petiole 6 in., more or less bristly. *Stipules* subulate. *Peduncles* about 1 in. *Bracteoles* 1 in., linear-subulate. *Flowers* yellow with a crimson centre. *Staminal-tube* antheriferous throughout. *Fruit* 6–10 by 1 in., pyramidal-oblong, glabrescent, cells 5–8-seeded. *Seeds* striate, hairy.—Variable. Roxburgh distinguishes the West Indian "Ochro," *H. esculentus*, from his *H. longifolius*, but does not specify in what the difference consists, and the plants are so variable that it is difficult to suppose the difference to be specific. The pods are used as pot herbs and for their demulcent properties.

SECT. 7. **Paritium.** Trees. *Bracteoles* connate at the base. *Capsule* with false dissepiments.

32. **H. tiliaceus,** *L.; DC. Prodr.* i. 454; arboreous, leaves cordate roundish acute rarely lobed glabrous above hoary beneath. *Roxb. Fl. Ind.* iii. 192; *Miq. Fl. Ind. Bat.* i. pt. 2, 153; *Beddome Fl. Sylvat. Anal. Gen.* t. 4. Paritium tiliaceum, *W. & A. Prodr.* i. 52; *Wight Ic.* t. 7; *Wall. Cat.* 1912; *Thwaites Enum.* 26; *Dalz. & Gibs. Bomb. Fl.* 17; *Griff. Notul.* iv. 523.

Coasts of both PENINSULAS, BENGAL, and CEYLON.—DISTRIB. Tropics of both hemispheres, usually near the coast.

A much-branched tree. *Leaves* 4–5 in. diam., leathery, roundish, crenulate, abruptly acuminate, 7-nerved, sometimes glandular beneath; petiole 1–3 in. *Stipules* subulate, 1 in. *Peduncles* terminal with stipule-like deciduous bracts at the base. *Bracteoles* 7–10, linear-lanceolate, connate above the middle. *Calyx* 1 in., about the length of the bracteoles or longer. *Sepals* lanceolate, downy outside. *Corolla* 4 in. diam., campanulate with a crimson centre. *Staminal-tube* 1½ in., antheriferous all the way down. *Capsule* shorter than the calyx, ovoid, pointed, spuriously 10-celled, 5-valved; valves pilose. *Seeds* reniform, thinly pilose.

VAR. 1. *tortuosus*, stem crooked, branches twisted, capsule as long as the calyx. Hibiscus tortuosus, *Roxb. Fl Ind.* iii. 192; *Wall. Cat.* 1912 G, 1913 B;—*Rheede, Hort. Mal.* i. t. 30.—In herbarium specimens I can find nothing to warrant the separation of this as a distinct species, the form of leaf and relative length of the bracteoles and capsule being subject to variation; but in a native state and under cultivation they look very different.

33. **H. floccosus,** *Mast.*, arboreous, leaves cordate angled thinly stellate-pilose on both surfaces, bracteoles connate into a bell-shaped 5-toothed tube less than half the length of the calyx.

Mount Ophir, MALACCA, *Maingay.*

A tree. *Young branches* and outer surface of the calyx covered with rusty floccose, tomentum. *Leaves* 4–5 in. diam., obscurely 5-angled; petiole shorter than the blade. *Peduncles* racemose, terminal; pedicels stout, 1½ in. long, jointed near the base; bracteoles deltoid at the apex and somewhat recurved. *Sepals* oblong-lanceolate, united for half their length. *Corolla* 3 in. diam., pink, twice the length of the calyx. *Petals* oblong-spathulate, venoso-striate, stellate-pilose on the outside. *Staminal-tube* pilose. *Capsule* oblong, truncate, shorter than the calyx, downy on the outside. *Seeds* cottony. —Allied to *H. ferrugineus*, DC., of Madagascar.

H. TRICUSPIS, *Banks in Cav. Diss.* iii. t. 55, f. 2; arboreous, leaves 3-lobed glandular beneath. *DC. Prodr.* i. 453; *Roxb. Fl. Ind.* iii. 202; *Wall. Cat.* 1914 B. Paritium tricuspe, *G. Don, Gen. Syst.* i. 485; *W. & A. Prodr.* i. 52.

Cultivated in NORTH-WEST INDIA and BENGAL (introduced from the Society isles, *Roxburgh*).

Tree, herbaceous portions covered with stellate white down. *Leaves* 4–5 by 3 in., glabrescent above, hoary-pubescent beneath, base cuneate or cordate, lobes lanceolate, slightly lobed; petiole 2½–3 in. *Stipules* ovate. *Peduncles* terminal, racemose. *Bracteoles* deciduous, ovate, leafy, half the length of the linear-lanceolate sepals. *Corolla* yellow with a purple base. *Capsule* spuriously 10-celled.—Roxburgh describes calyx and epicalyx as ten-parted, but this is probably an error.

H. ROSA SINENSIS, *L.; DC. Prodr.* i. 448; shrubby, leaves ovate acuminate nearly glabrous, peduncles axillary, as long or longer than the adjoining leaf, staminal tube exceeding the corolla. *Cav. Diss.* iii. t. 69, f. 2; *Roxb. Fl. Ind.* iii. 194; *Wall. Cat.* 1890 B to F.; *W. & A. Prodr.* i. 49; *Miq. Fl. Ind. Bat.* i. pt. 2, 156.—*Rheede, Hort. Mal.* ii. t. 17, *and* vi. t. 43.

Cultivated in gardens throughout India.

Stem woody, branched, not prickly. *Leaves* entire at the base, coarsely toothed at the apex. *Stipules* ensiform. *Bracteoles* 6, 7, linear, half the length of the bell-shaped calyx. *Sepals* ¾ in., lanceolate, connate below the middle. *Corolla* 3 in. diam., red. *Capsule* roundish, many-seeded (Loureiro).—There are numerous varieties differing in colour, duplication, &c. The flowers are used to black shoes. Roxburgh says it is wild in Hindostan, but I have seen no wild specimens. Wight and Arnott suggest that the plant should be placed in section Bombicella, but the seeds are not known, and the habit is more that of the section Ketmia.

There is a plant in herbaria from Griffith and others, to which the manuscript names of *H. liliiflorus* (not of DC.), and of *H. Arnotti* (not of Gray), are attached. It appears identical with Wallich's 1890 D, described in Wall. Cat. l.c. as a hybrid plant introduced to the Calcutta garden from Mauritius and said to be a form of *H. rosa sinensis.*

H. MUTABILIS, *L.; DC. Prodr.* i. 452; arborescent, leaves downy 5-angled, peduncles axillary nearly as long as the leaf, bracteoles 10 linear nearly distinct. *Cav. Diss.* iii. t. 62, f. 1; *Roxb. Fl. Ind.* iii. 201; *W. & A. Prodr.* i. 51; *Wall. Cat.* 1907, 1, 2, 3, D to G; *Miq. Fl. Ind. Bat.* i. pt. 2, 158. H. æstuans, *Rottler in Herb.*—*Rheede Hort. Mal.* vi. 38–42.

Cultivated in gardens, native of China (*Roxburgh*).

A small tree without prickles. *Leaves* 4 in. diam., cordate, toothed; petiole 3 in. *Peduncle* 4–5 in., jointed near the top. *Bracts* shorter than the calyx. *Flowers* 3–4 in. diam. *Sepals* ovate-lanceolate, connate below the middle. *Corolla* white or pink on first opening in the morning, deep red by night. *Capsule* globose, flattened, hairy. *Seeds* reniform, hispid.—In Dr. Brandis' herbarium there is a specimen from Martaban, labelled *H. venustus,* Blume (Bijdr. 71), which differs from the Indian specimens of *H. mutabilis* in its more tomentose pubescence and hirsute seeds; Blume's plant, moreover, is said to have 5 bracteoles, but there are more than 5 in the Martaban plants.

H. SYRIACUS, *L.; DC. Prodr.* i. 448; shrubby, leaves cuneiform ovate 3-lobed dentate, peduncle axillary as long as the petiole, bracteoles linear half the length of the calyx. *Cav. Diss.* iii. t. 69, f. 1; *Roxb. Fl. Ind.* iii. 195; *Wall. Cat.* 1891; *Miq. Fl. Ind. Bat.* i. pt. 2, 157. H. rhombifolius, *Cav. Diss.* t. 69, *ex Roxb.*

Cultivated throughout India and in China.

Branches destitute of prickles. *Leaves* 2 in., nearly or quite glabrous; petiole short. *Peduncle* shorter than the petiole. *Bracteoles* 6–7, linear. *Sepals* ovate-lanceolate, longer than the bracteoles. *Petals* obovate, longer than the calyx. *Anthers* in whorls all the way up the column. *Capsule* oblong, obtuse, slightly hispid. *Seeds* pilose.

13. **THESPESIA,** Corr.

Tall trees or shrubs. *Leaves* entire or lobed. *Inflorescence* axillary. *Bracteoles* 5–8, arising from the thickened end of the peduncle, deciduous. *Calyx* truncate, minutely 5-toothed or 5-parted. *Corolla* convolute. *Staminal-tube* 5-toothed at the apex. *Ovary* 4–5-celled; style club-shaped, 5-furrowed, entire or 5-toothed; ovules few in each cell. *Capsule* loculicidal or scarcely dehiscent. *Seeds* glabrous or tomentose; cotyledons conduplicate, black-dotted.—A genus of few species, natives of tropical Asia, Madagascar, and the islands of the Pacific.

1. **T. Lampas,** *Dalz. & Gibs. Bomb. Fl.* 19; subarboreous, herbaceous portions downy, leaves palmately lobed. Hibiscus Lampas, *Cav. Diss.* iii. 154, t. 56, f. 2; *DC. Prodr.* i. 447; *Roxb. Fl. Ind.* iii. 197; *Wight Ic.* t. 5; *W. & A. Prodr.* i. 48; *Wall. Cat.* 1889, 1 to 4 & E to I. *Thwaites Enum.* 26; *Miq. Fl. Ind. Bat.* i. pt. 2, 153. H. tetralocularis, *Roxb. Fl. Ind.* iii. 198. Azanza Lampas, *Alefeld in Bot. Zeit.* 1861, 297. H. gangeticus, *Roxb. Ic. ined. and Heyne in Herb.* Paritium gangeticum, *Don, Gen. Syst.* i. 485.

Tropical Himalaya, alt. 1–4000 ft., from Kumaon eastwards; Bengal, the Western Peninsula, Birma, and Ceylon.—Distrib. Java, East Tropical Africa.

Arborescent, not prickly. *Leaves* 5 in. diam., cordate, 3-lobed, lobes spreading, acuminate, sparingly stellate, pilose above, tomentose beneath, midrib with a glandular pore at the base beneath; petioles 2½ in.. downy. *Stipules* subulate. *Peduncles* axillary or terminal, panicled, 3-flowered. *Bracteoles* 4–8, subulate, deciduous. *Calyx* of 5 subulate sepals connate below the middle. *Corolla* campanulate, yellow with a crimson centre. *Capsule* ovoid, pointed, villous, 5- rarely 4-valved, valves hispid glabrescent. *Seeds* glabrescent.

2. **T. populnea,** *Corr. in Ann. Mus.* ix. p. 290; arboreous, herbaceous portions covered with peltate scales, leaves entire ovate acute or acuminate. *Cav. Diss.* iii. 152, t. 56, f. 1; *DC. Prodr.* i. 456; *W. & A. Prodr.* i. 54; *Wight Ic.* t. 8; *Thwaites Enum.* 27; *Beddome Fl. Sylvat.* t. 63; *Dalz. & Gibs. Bomb. Fl.* 18; *Wall. Cat.* 1888, 1, 2, & C to H. *Miq. Fl. Ind. Bat.* i. pt. 2, 150. Hibiscus populneus, *L.; Roxb. Hort. Beng.* 51; *Flor. Ind.* iii. 190. H. populneoides, *Roxb. l.c.* Malvaviscus populneus, *Gærtn. Fruct.* ii. 253, t. 135. Azanza acuminata, *Alefeld Bot. Zeit.* 1861, 299.—*Rheede Hort. Mal.* i. 29.

Tropical shores of Bengal, Ceylon, and both Peninsulas.—Distrib. Tropical Asia, the Pacific islands, and Africa.

A small tree. *Leaves* 3 in. diam., cordate, roundish, acuminate, quite entire, 5–7-nerved, with a glandular pore beneath between the nerves; petiole 2½ in. *Peduncle* axillary, shorter than the petiole. *Bracteoles* obsolete or 5, oblong-lanceolate, deciduous, as long as the cup-shaped 5-toothed calyx. *Corolla* 2–3 in. diam. *Staminal-tube* toothed at the top; filaments ascending. *Capsule* 1½ in., oblong, depressed, scaly, ultimately glabrescent. *Seeds* pilose or powdery on the surface.—The characters assigned by Roxburgh to *Hibiscus populneoides* are not sufficient, as on the same specimen acute and acuminate, glandular and glandless leaves may be seen, and the characters of the capsule appear equally invalid. Roxburgh describes the integument of the capsule in *H. populneoides* as double, "the exterior one, which is fragile and composed of five valves, opens from the apex spontaneously when ripe, exposing the inner lamina, which is remarkably strong, tough, reticulated with fibres and not opening without considerable force;" whereas in *H. populneus* the integument "is single, and can be easily broken by the pressure of the thumb and finger."

14. GOSSYPIUM, Linn.

Herbs shrubs or low trees. *Leaves* palmately lobed. *Peduncles* axillary, 1-flowered, jointed. *Flowers* large, yellow with, or rarely without, a crimson centre, or all purplish. *Bracteoles* 3, large, leafy, cordate, sprinkled like the calyx with black glandular dots. *Calyx* cup-shaped, truncate or slightly 5-toothed. *Petals* convolute or spreading. *Staminal-tube* as in *Hibiscus. Ovary* 5-celled; style clavate, 5-grooved at the apex with five stigmas; ovules many in each cell. *Capsule* loculicidally 3–5-valved. *Seeds* densely clothed with woolly hairs; cotyledons leafy, plicate, sprinkled with black dots.—DISTRIB. Tropics of the Old and New World.

The very numerous forms of this genus are distributed by cultivation throughout the hotter regions of the globe. Their synonymy is extremely complicated, and has baffled the attempts of many authors. Wight and Arnott greatly added to the confusion by their attempts to reduce all the varieties to two species, *G. album* and *G. nigrum.* Speaking broadly, it is not difficult to recognise the following forms. *G. Stocksii* is wild in Sindh, and may be the primitive form of the cultivated states of *G. herbaceum.*

1. **G. Stocksii,** *Mast.;* shrubby, branching, leaves palmately 3–5-lobed lobes glabrous oblong obtuse, bracteoles deeply laciniate, segments linear lanceolate, cotton yellow adherent to the seeds and with no felted down beneath.

Limestone rocks on the coasts of SINDH, truly wild, *Stocks; Dalzell.*

Branches straggling, diffuse. *Leaves* small, rounded with five roundish or obtuse lobes. *Flowers* small, yellow. *Capsule* ovoid. *Cotton* not separable from the seed.—It seems probable that this may be the wild form of the plant cultivated as *G. herbaceum,* and therefore the parent type of all the forms of Indian cotton. Dalzell and Gibson (Bomb. Fl. 21) apparently confound Roxburgh's *G. obtusifolium* with this plant, which they say is found all over limestone rocks of the Sindh coast, though the description they give does not apply to this, but to the cultivated form of *G. herbaceum* just alluded to. Stocks, indeed, remarks, that in cultivation the leaves of this plant assume the appearance of those of *G. herbaceum.* Roxburgh's *G. obtusifolium,* which he says is a native of Ceylon, appears, moreover, from his drawing to be a form of *G. herbaceum.* Thwaites does not mention any species as native of Ceylon.

G. HERBACEUM, *L.; DC. Prodr.* i. 456; annual or perennial, hairy or subglabrous, leaf-lobes broadly ovate acuminate, flowers yellow with a purple centre rarely wholly yellow or white or purple, petals spreading, bracteoles not divided below the middle, sometimes entire or nearly so, cotton white or brownish, adherent to the seeds, overlying a grey or greenish down. *Roxb. Cor. Pl.* iii. 269; *Fl. Ind.* iii. 184; *Wight Ic.* t. 9, 11; *Royle Ill.* t. 23, f. 1; *Wall. Cat.* 1880; *Cav. Diss.* vi. 310, t. 164, f. 2; *Parlatore Sp. di Cotoni,* p. 31, t. 2; *Mast. in Oliv. Fl. Trop. Afr.* i. 212. G. indicum, *Lam. Encycl.* ii. 134; *DC. Prodr.* i. 456. G. album, *W. & A. Prodr.* i. 54. G. micranthum, *DC. Prodr. l.c.* (*in part*); *Royle Ill.* i. 49.—*Rheede Hort. Mal.* i. t. 31.

Cultivated; furnishing the varieties of Indian cotton, such as Dacca and Berar.

Erect, shrubby, or herbaceous, nearly glabrous or more or less hairy, and with a few scattered glandular points. *Leaves* cordate, 3–5- rarely 7-lobed, usually with a gland on the under surface of the midrib. *Stipules* ovate-lanceolate, entire or slightly toothed. *Peduncles* shorter than the petiole. *Bracteoles* equalling the capsule. *Calyx* truncate, or obsoletely crenulate, much shorter than the bracteoles. *Petals* obovate or cuneate. *Capsule* ovate, globose, mucronate, 3–5-valved. *Seeds* 5–7 in each cell, ovoid; cotton white, rarely yellowish, overlying a greenish or greyish down.

VAR. 1. *obtusifolium*, Roxb. Fl. Ind. iii. 183 (sp.); shrubby, much branched, leaves 3–5-lobed, lobes ovate entire, stipules falcate, bracteoles nearly entire, *Wall. Cat.* 1880, *in part.* China cotton, *Roxb. l.c.* 185?—This is the form found in Ava by Griffith, Journals, p. 147.

VAR. 2. *hirsutum*, L. (sp.); hairy or hispid, foliage of *G. herbaceum*, but leaf-lobes usually less rounded and more elongate, bracteoles deeply gashed as in *G. barbadense*, petals yellow without a crimson spot, cotton white with underlying greenish or grey down. G. hirsutum, *L.; Roxb. Fl. Ind.* iii. 187; *DC. Prodr.* i. 456; *Wall. Cat.* 1880, *in part; Royle Ill.* 1, p. 100; *Parlatore Sp. Cot.* 42, tab. 5.—Yields Upland Georgian Cotton.

VAR. 3. *religiosum*, Roxb. Fl. Ind. iii. 185 (sp.); leaves hairy or subglabrous, with five triangular acute lobes, stipules cordate acuminate, bracteoles deeply laciniate, petals entirely yellow, seeds covered with firmly adherent short tawny down and long wool of the same colour. G. religiosum, *Roxb. Fl. Ind.* iii. 185; *Cav. Diss.* t. 164, f. 1; *Wall. Cat.* 1885, M; ? of Linnæus and others.—Yields Nankeen Cotton.

VAR. *vitifolium*, Roxb. Fl. Ind. iii. 186 (sp.), not of others; sub-arboreous, dark purple and hairy, leaves 3–5-lobed, lobes triangular acuminate, capsules oblong, seeds clothed with firmly adhering short greenish-grey down under the long fine white wool.—I have not been able to identify this variety, but it is evidently a form of *G. herbaceum*. The *G. vitifolium* of Roxburgh's drawings is a different plant.

G. BARBADENSE, *Linn.; DC. Prodr.* i. 456; herbaceous or shrubby, leaves nearly glabrous cordate 3–5-lobed lobes oblong acuminate, bracteoles very large deeply gashed, petals convolute, yellow with a crimson spot, capsule oval acuminate, seeds black, free or coherent, covered with readily separable white or brownish cotton. *Roxb. Fl. Ind.* iii. 187; *Wight Ill.* t. 28 A and B: G. nigrum (*in part*), *W. & A. Prodr.* i. 54; *Wall. Cat.* 1875, D, E, G, H; *Royle Ill.* p. 100, *Cult. of Cotton*, t. 3; *Parlatore Sp. Cot.* 49, t. iii.; *Mast. in Oliv. Fl. Trop. Afr.* i. 210.

Cultivated; yields the American varieties known as Barbadoes, Bourbon, Sea-island, New Orleans, &c., Cottons.

A shrub or tall herb, herbaceous portions glabrescent, sprinkled with black dots, branches purplish. *Leaves* 1-glandular, deeply 3–5-lobed, lobes tapering, acuminate. *Stipules* linear-lanceolate. *Peduncle* thick, often glandular at the apex. *Ovary* ovoid, pitted, 3–5-celled.

VAR. *acuminatum*, Roxb. Hort. Beng. 51; *Fl. Ind.* iii. 186 (sp.); sub-arboreous, leaves 3–5-lobed, lobes oblong-lanceolate acuminate, flowers yellow with a crimson spot, petals spreading, seeds black covered with easily separable white wool and adhering firmly to each other. *Wight Ill.* t. 27; *Royle Ill.* i. p. 98; *Cult. Cott.* t. 3, f. 5. G. peruvianum, *Cav.; DC. Prodr.* i. 456. G. vitifolium, *Lam. Encyl.* ii. 135; *Roxb. Ic. ined. not of Fl. Ind.; Cav. Diss* t. 166; *Wall. Cat.* 1875, F. G. religiosum, *Parlatore Sp. di Cott.* 55, t. 4 (*not of authors*).—Yields the varieties known as Peruvian, Brazilian, Kidney Cotton, &c. The plant is usually larger in foliage, flower, and capsule than the other varieties.

G. ARBOREUM, *L.; DC. Prodr.* i. 456; arborescent or shrubby, leaves nearly glabrous, deeply palmately 5–7-lobed lobes linear-oblong, flowers purple rarely white, bracteoles nearly entire, cotton not readily separable from the seed. *Roxb. Fl. Ind.* iii. 183; *Wight Ic.* t. 10; *Royle Ill.* 23, f. 2; *Wall. Cat.* 1875 J., 1881; *Parlatore Sp. Cot.* 24, t. 1; *Mast. in Oliv. Fl. Trop. Afr.* i. 211. G. nigrum, *Ham. in W. & A. Prodr.* i. 54, *in part* (*excl. syn.*). G. rubicundum, *Roxb. Ic. ined. and in herb.—Rheede Hort. Mal.* t. 31? *Burm. Fl. Ind.* 150.

Plains of INDIA, in gardens, but not generally cultivated; KASHMIR, *Falconer*.

A shrub or low tree, rarely a herb; branches purple, pilose. *Leaves* 1-glandular, lobes mucronate, contracted at the base, often with a supplementary lobe in the sinus. *Stipules* ensiform. *Bracteoles* cordate, ovate, acute. *Petals* spreading. *Staminal-tube* antheriferous for its whole length. *Capsule* about 1 in., oblong-pointed. *Seeds* free, covered with white wool overlying a dense green down.

15. **KYDIA,** *Roxb.*

Trees with stellate pubescence. *Leaves* palminerved, usually lobed. *Flowers* panicled, polygamous. *Bracteoles* 4–6, leafy, connate at the base, accrescent and spreading in fruit. *Sepals* 5, connate below the middle. *Petals* 5, obcordate, oblique, longer than the calyx, adnate to the staminal tube. *Staminal-tube* divided about the middle into 5 divisions each bearing 3 reniform anthers which are imperfect in the female flower. *Ovary* 2–3-celled; style 3-cleft, stigmas 3 peltate, imperfect in the male flower; ovules 2 in each cell, ascending. *Capsule* subglobose, muticous, loculicidally 3-valved. *Seeds* reniform, furrowed.—DISTRIB. Exclusively Indian.

1. **K. calycina,** *Roxb. Hort. Beng.* 50; *Cor. Pl.* iii. 11, t. 215; *Fl. Ind.* iii. 188; leaves downy beneath, bracteoles oblong downy. *Wight Ic.* t. 879–80; *W. & A. Prodr.* i. 70; *Dalz. & Gibs. Bomb. Fl.* 24; *Beddome Fl. Sylvat.* t. 3; *Wall. Cat.* 1176. K. Roxburghiana, *Wight Ic.* iii. t. 881; *Wall. Cat.* 1177. K. fraterna, *Roxb. Cor. Pl.* t. 216; *Fl. Ind.* iii. 189; *W. & A. l.c.* K. pulverulenta, *Ham. in Wall. Cat.* 1176.

Tropical regions of the HIMALAYA, from Kumaon eastward, and throughout the WESTERN GHATS. BIRMA, *Wallich.*

A tree. *Leaves* 4–5 by 3 in., rounded, cordate, palmately 7-nerved, more or less lobed, midlobe longest, glabrous above or with thinly scattered hairs, closely felted beneath; petiole 1–2 in. *Inflorescence* much branched, many-flowered. *Bracteoles* 4–6, oblong-spathulate, nearly as long as the calyx, ultimately spreading. *Flowers* white or pink. *Sepals* ovate, acute. *Petals* exceeding the sepals, obcordate. *Staminal-tube* shorter than the petals, branches opposite to the sepals.—The size and proportion of the parts vary according to the sex of the flower.

2. **K. glabrescens,** *Mast.*; leaves suborbicular slightly angled, bracteoles oblanceolate glabrous.

BHOTAN, ASSAM, and MALACCA, *Griffith* (all the localities).

A tree, herbaceous portions sparingly hairy. *Leaves* 4 by 3½ in., palminerved, obscurely lobed, base wedge-shaped; petiole 2½ in. *Panicle* terminal; bracteoles 4–5, spreading, accrescent, ultimately 1 in. *Sepals* lanceolate. *Capsule* the size of a small pea, shorter than the incurved sepals, globose, pubescent.—I have only seen fruiting specimens.

15.* **ADANSONIA,** *Linn.*

Tree with a short thick trunk and very widely spreading branches forming a mushroom-shaped head. *Leaves* pubescent beneath when young, glabrous digitate, deciduous. *Flowers* solitary, axillary, pendulous, long-peduncled. *Calyx* leathery, cup-shaped, 5-cleft, bibracteolate. *Petals* 5, exceeding the sepals, adnate below to the stamens. *Staminal-tube* cylindrical, dividing above into numerous filaments; anthers reniform, 1-celled. *Ovary* 5–10-celled; style long, exserted, divided into as many stigmatic branches as there are cells to the ovary, stigmas radiating; ovules many in each cell. *Fruit* oblong, woody, indehiscent; with mealy pulp in the inside. *Seeds* reniform, testa thick, albumen thin, embryo curved, cotyledons contortuplicate.—Two species are known, one the Baobab, a native of Africa, not truly wild in India, and the other Australian.

A. DIGITATA, *L.; DC. Prodr.* i. 478; *Cav. Diss.* v. 298, t. 15; *W. & A. Prodr.* i. 61; *Roxb. Fl. Ind.* iii. 164; *Thwaites Enum.* 28; *Wall. Cat.* 1836; *Mast. in Oliv. Fl. Trop. Afr.* i. 212.

Cultivated in various parts of India and Ceylon.—DISTRIB. Tropical Africa.

16. **BOMBAX,** *Linn.*

Trees. *Leaves* digitate, deciduous. *Peduncles* axillary or subterminal, solitary or clustered, 1-flowered. *Flowers* appearing before the leaves. *Bracteoles* 0. *Calyx* leathery, cup-shaped, truncate or 5–7-lobed. *Petals* obovate. *Stamens* pentadelphous, bundles opposite the petals, and divided above into numerous filaments; anthers reniform, 1-celled. *Ovary* 5-celled; style clavate, stigmas 5; ovules many in each cell. *Capsule* loculicidally 5-valved, valves leathery, woolly within. *Seeds* woolly, testa thin, albumen scanty; cotyledons contortuplicate.—DISTRIB. A genus of about 10 species, mostly tropical American, one is tropical African.

1. **B. malabaricum,** *DC. Prodr.* i. 479; trunk and branches prickly, leaflets 5–7 quite entire cuspidate, base tapering, filaments ligulate half the length of the petals, capsule oblong obtuse. *Wight Ill.* t. 29; *W. & A. Prodr.* i. 61; *Wall. Cat.* 1840; *Beddome Fl. Sylvat.* t. 82. Salmalia malabarica. *Schott. Meletem*, 35; *Thwaites Enum.* 28; *Dalz. & Gibs. Bomb. Fl.* 22; *Miq. Fl. Ind. Bat.* i. pt. 2, 166. Bombax heptaphylla, *Cav. Diss.* v. p. 296; *Roxb. Hort. Beng.* 50; *Cor. Pl.* iii. t. 247; *Fl. Ind.* iii. 167. B. Ceiba, *Burm. Fl. Ind.* 145 *excl. syn.* Gossampinus rubra, *Ham. in Trans. Linn. Soc.* xv. 128.—*Rheede Hort. Mal.* iii. t. 52.

Tropical EASTERN HIMALAYA, and throughout the hotter forest regions of India, to BIRMA and CEYLON.—DISTRIB. Java, Sumatra.

A large tree, covered with stout hard conical prickles; branches spreading. *Leaflets* 6–12 in., glabrous; petiole longer than the leaflets, secondary petioles 1 in. *Stipules* small, caducous. *Flowers* numerous, fascicled at or near the ends of the branches. *Calyx* 1 in., cup-shaped, smooth externally, silky within, margin slightly lobed, ultimately irregularly cleft, deciduous with the corolla and stamens. *Corolla* 6–7 in., red or white. *Petals* 5, oblong, recurved, fleshy, twice the length of the stamens. *Staminal-tube* short, filaments numerous, pluriseriate, 5 innermost forked at the top, each with an anther, 10 intermediate shorter, outer very numerous. *Style* longer than the stamens. *Capsule* 6–7 in., ovoid, downy, 5-valved, valves silky within. *Seeds* numerous, obovate, smooth.—Cotton tree.

2. **B. insigne,** *Wall. Pl. Asiat. Rar.* i. 71, t. 79, 80; *Cat.* 1841; *Kurz. in Journ. As. Soc. Beng.* 1873, ii. 61; trunk without prickles, leaflets 7–9 obovate cuspidate acuminate glaucous beneath, filaments slender two-thirds the length of the petals.

BIRMA, PEGU, and the Andaman islands.

A tree, 20–30 ft.; trunk marked with large leaf-scars. *Leaflets* 5 in. *Flowers* solitary, large, scattered on leafless branches. *Peduncles* ½ in., thick, club-shaped, jointed at the top. *Flowers* 10 in. diam.; buds globose. *Calyx* 1½ in., urceolate-globose, truncate or slightly two-lobed. *Petals* 5–6 in., linear-oblong, recurved, downy, scarlet within. *Stamens* many. *Ovary* ovoid. *Stigma* 5-lobed. *Capsule* 10 by 1 in., elongated, curved at the apex, glabrous.

17. **ERIODENDRON,** DC.

Trees. *Leaves* digitate, deciduous. *Flowers* appearing before the leaves, tufted at the ends of the branches, or axillary, large white or rose coloured. *Bracteoles* 0. *Calyx* cup-shaped, truncate, or 3–5-fid. *Petals* oblong. *Staminal* bundles 5, opposite the petals connate at the base each bearing 2–3 sinuous or linear anthers. *Ovary* ovoid, 5-celled; style cylindrical, dilated, stigma obscurely 5-lobed. *Capsule* oblong, coriaceous or woody, 5-celled, 5-valved, valves densely silky within. *Seeds* globose or obovoid, testa crustaceous, smooth with silky hairs, albumen scanty; cotyledons contortuplicate.—

DISTRIB. A genus of about 3 species, most of them American, one occurs in tropical Africa.

1. **E. anfractuosum,** *DC. Prodr.* i. 479; leaflets lanceolate cuspidate entire or serrulate towards the point glaucous beneath. *Wall. Cat.* 1839; *W. & A. Prodr.* i. 61; *Wight Ic.* t. 400; *Griff. Not.* iv. 533; *Dalz. & Gibs. Bomb. Fl.* 22; *Miq. Fl. Ind. Bat.* i. pt. 2. 166; *Beddome Fl. Sylvat. Anal. Gen.* t. 4. Bombax pentandrum, *Linn. Sp. Pl.* 989; *Cav. Diss.* v. 293, t. 151; *Roxb. Fl. Ind.* iii. 165. B. orientale, *Spreng. Syst.* iii. 124. Ceiba pentandra, *Gærtn. Fruct.* ii. 244, t. 133; *Ham. in Trans. Linn. Soc.* xv. 126. Eriodendron orientale, *Steud. Nomencl.* 587; *Thwaites Enum.* 28.—*Rheede Hort. Mal.* iii. t. 49, 50; *Rumph. Amb.* i. t. 80.

Forests throughout the hotter parts of INDIA and CEYLON.—DISTRIB. S. America, W. Indies, Trop. Africa?

A tall tree, trunk straight, tapering, prickly when young; branches horizontal, verticillate. *Leaflets* 5–8, 3–4 by 1 in.; petioles at least as long as or longer than the leaflets. *Stipules* small, caducous. *Peduncles* about 2 in., club-shaped, tufted, 1-flowered. *Calyx* $\frac{3}{8}$ in., cup-shaped, 5-cleft, lobes roundish, glabrous on the outside, slightly downy within. *Petals* 5, oblong, connate at the base, downy externally, yellowish within, twice the length of the calyx. *Filaments* shorter than the petals. *Ovary* conical; style as long as the stamens, declinate, dilated above the contracted base, stigma obscurely 5-lobed. *Capsule* oblong like a cucumber; septa membranous, tardily dehiscing. *Seeds* numerous, subpyriform, black, glabrous.—Roxburgh doubts whether the Indian species be the same as the West Indian, which latter is described with an irregular trunk, often ventricose or thicker above; the shape of the fruit is also different. DC. l.c. makes 3 varieties—1. *Indicum*, above described, with flowers yellowish within; 2. *Caribæum*, with rose coloured flowers; 3. *Africanum*, to which no differential characters are assigned. In herbaria the specimens from the East and from the West do not appear to differ. Planchon, however (in herb.), has suggested that the name *E. Rheedii* be given to the Indian form.

18. CULLENIA, Wight.

A tall tree. *Leaves* simple, scaly. *Flowers* fascicled in the axils of the leaves. *Bracteoles* 3–5, connate for nearly their whole length into a deciduous cylindric tube, clothed, like the calyx, with peltate scales. *Sepals* 5, connate for nearly their whole length into a deciduous cylindric tube. *Petals* 0. *Staminal-tube* 5-cleft, divisions linear, exserted, declinate; anthers small, subglobose, 1-celled, clustered at intervals on the branches of the staminal-tube. *Ovary* 5-celled, style elongate, very hairy, stigma capitate; ovules 2 in each cell, superposed. *Fruit* globose, densely clothed with spines, ultimately 5-valved. *Seeds* with a fleshy aril, albumen 0, cotyledons fleshy unequal.

1. **C. excelsa,** *Wight Ic.* 1761, 2; *Beddome Flor. Sylvat., Anal. Gen.* t. 4; *Thwaites Enum.* 28. Durio zeylanicus, *Gardn. in Calc. Journ. Nat. Hist.* viii.

Iyamally hills, MALABAR, *Wight;* CEYLON; common in the central provinces, alt. 2500 ft., *Thwaites.*

Leaves elliptic, acuminate, bright shining green above, silvery and densely scaly beneath. *Flowers* densely packed on contracted branches, short peduncled, pointed at the base. *Fruit* the size of a large orange. *Seeds* like a chestnut.

19. DURIO, Linn.

Trees. *Leaves* entire, leathery, closely penninerved, scaly, rarely hairy beneath. *Flowers* in lateral cymes; peduncles angular. *Bracteoles* 3, connate below into a cup, tips free, deciduous. *Calyx* bell-shaped, leathery, like the bracteoles densely scaly, 5-fid, lobes valvate oblong or rounded. *Petals* 5, contorted-imbricate, spathulate, longer than the sepals. *Staminal-tube* divided into 4–5 phalanges opposite the petals; filaments many, bearing a globose head of sinuous 1-celled anthers, or a single annular 1-celled anther. *Ovary* scaly externally, 4-5-celled; styles connate, stigmas capitate; ovules many and 2-seriate in each cell. *Fruit* very large, subglobose or oblong, spiny, indehiscent or loculicidally 5-valved. *Seeds* arillate; cotyledons fleshy, often connate.—DISTRIB. Malay Peninsula and islands; species 3.

1. **D. Zibethinus,** *DC. Prodr.* i. 480; leaves scaly beneath, flowers about 3 in. diam., staminal column tubular at the base only, anthers sinuous in globose heads. *Koen. in Trans. Linn. Soc.* vii. 266, t. 14–16; *Roxb. Fl. Ind.* iii. 399. *Miq. Fl. Ind. Bat.* i. pt. 2, 167. *Griff. Not.* iv. 528; *Ic.* t. 596. —*Rumph. Amb.* i. 99, t. 29.

MALACCA, cultivated only?—DISTRIB. Malay islands.

A tree. *Leaves* 6–7 by 2–2½ in., base rounded, obovate-oblong, entire, feather-veined, leathery, shining above, scaly beneath, not hairy; petiole about 1 in., thickened at the apex. *Flowers* in lateral trichotomous cymes; peduncles angular, subulate. *Bracteoles* deciduous, half the length of the calyx. *Calyx* bell-shaped, leathery, densely clothed with large peltate scales, 5-lobed, lobes obtuse. *Petals* oblong, tapering at the base, longer than the calyx. *Stamens* longer than the petals. *Ovary* oblong, scaly. *Fruit* subglobose, very large, somewhat woody, densely muricate, indehiscent or tardily 5-valved, pulpy within. *Seeds* arillate.—The *Durian* is probably not indigenous in the Malay Peninsula. Wallace (Kew. Gard. Mis. viii. 228) states that two varieties, both small fruited, are indigenous in Borneo.

2. **D. malaccensis,** *Planch. mss.*; leaves scaly beneath, flowers large (about 5 in. diam.), staminal column tubular for half its length, anthers sinuous in globose heads.

MALACCA, *Griffith, Maingay;* BIRMA, *Brandis.*

A tree, with the habit and foliage of *D. Zibethinus,* but with the flowers nearly twice the size. *Petals* twice the length of the sepals. *Staminal-tube* divided, about the middle only, into 5 phalanges. *Ovary* and fruit as in the preceding.—Perhaps the wild form of the *Durian.*

3. **D. Oxleyanus,** *Griff. Notul.* iv. 531; leaves glabrous above pubescent or hairy on the under surface, scaly on midrib only, flowers about 1 in. diam., stamens 4–5-adelphous, anthers annular solitary on the end of each filament.

MALACCA, *Griffith, Maingay.*

A tree, with the habit and foliage of *D. Zibethinus. Calyx* ventricose. *Petals* oblong-spathulate, longer than the sepals. *Staminal-phalanges* 4 or 5, dividing about the middle into numerous filaments each bearing a solitary anther with a thickened black connective bordered by an annular cell. *Ovary* and fruit of *D. Zibethinus,* but smaller.—Referred by Planchon, in Herb. Kew, to *Neesia,* but erroneously.

20. **BOSCHIA,** Korth.

Trees. *Leaves* simple entire, scaly beneath. *Flowers* small, axillary. *Bracteoles* 2–3, connate at the base, deciduous. *Calyx* deeply 4–5-parted. *Petals* linear-ligulate, entire or laciniate. *Stamens* many, some free, others irregularly coherent, outermost without anthers; anthers oblong, 1-celled, opening by a terminal pore, solitary, or in groups of 2–6. *Pollen* globose 3-valved. *Ovary* 3–5-celled, style elongate; ovules one or more in each cell, ascending. *Fruit* oblong, 3–5-celled, 3–5-valved, valves muricate, bright red. *Seeds* few, oblong black, with a fleshy orange-coloured, cup-shaped arillus extending over half their surface; cotyledons amygdaloid; radicle next the hilum.—DISTRIB. Malay Peninsula and archipelago. Species 2.

1. **B. Griffithii,** *Mast.;* leaves ovate oblong cuspidate penniveined scaly beneath, flowers solitary or 2–3 in short axillary cymes. Heteropyxis, *Griff. Notul.* iv. 524; *Ic. Pl. As.* t. 594.

MALACCA, *Griffith, Maingay.*

A small tree, *bark* grey, *wood* reddish. *Leaves* 3–4 by 1½–2 in., glabrous above, white and sparingly lepidote beneath; petiole short. *Stipules* linear, caducous. *Peduncle* very short. *Bracteoles* 2–3, deciduous. *Flowers* ½ in. diam. *Calyx* 4-parted, segments ultimately reflexed. *Petals* linear-spathulate, variable in number, longer than the calyx. *Anthers* minute. *Ovary* covered with spines, each tipped by a peltate stelliform scale. *Fruit* about 2 in. *Seed* ¾ in., solitary in each cell.

21. **NEESIA,** Blume.

Trees. *Branches* marked with large leaf-scars. *Leaves* entire, feather-veined. *Stipules* leafy. *Inflorescence* of cymes produced from the stem in the axils of the fallen leaves. *Bracteoles* 3, connate into a campanulate tube, circumsciss and deciduous, covered, like the sepals, with peltate scales. *Calyx* closed, ultimately dilated and cushion-shaped at the base, tubular, conical above, opening by a circular irregularly crenulate orifice at the top. *Petals* 5, free, imbricate. *Stamens* in 5 bundles, alternate with the petals, each dividing midway into numerous filaments, the terminal or central one of which bears a 2-lobed and the lateral filaments a 1-lobed extrorse anther opening lengthwise, connective thick; staminodes 0. *Ovary* very shortly stalked, oblong, 5-celled; style short; stigma conic; ovules numerous 2-seriate, horizontal, anatropous. *Fruit* ovoid, woody, muricate, loculicidally 5-valved. *Seeds* albuminous; aril 0; cotyledons flat, leafy. (Fruit and seed after Blume.)—DISTRIB. Two species, a Javanese and Malaccan.

1. **N. synandra,** *Mast.*

PENANG, *Maingay.*

A lofty tree, trunk stout. *Leaves* 9–12 by 4–5 in., cordate-oblong, obtuse, coriaceous, minutely puberulous; petiole 2 in. *Stipules* oblong, 1-nerved, 1½ in. *Peduncle* stout, angular. *Fruit* of *Durian*, (Maingay).—This differs from Blume's *N. altissima* in the form of the leaf and particularly in the stamens, which are described and figured by Blume as joined at the base only. *Neesia Griffithii* of herbaria, and upon which Bentham (Gen. Pl. i. 213) partly constructed, as it would seem, the generic character, is a true *Durio* (*D. Oxleyanus*, Griff.).

22. **CŒLOSTEGIA,** Benth.

A tall tree. *Leaves* simple, quite entire, scaly beneath. *Flowers* axillary, fascicled, subsessile. *Bracteoles* 3–4, scaly, combined below into a cup-shaped tube. *Sepals* 5, lanceolate, much longer than the bracteoles, connate below the middle into a 5-lobed 5-pouched cup. *Petals* 5, free, attached to the base of the calyx and much smaller than it. *Stamens* in 5 bundles opposite to the sepals and adherent to their bases, included; anthers small, subglobose. *Ovary* partly immersed in the calyx-tube, 5-celled; cells few-ovuled; style filiform, stigma large capitate peltate 5-lobed. *Fruit* unknown.—The following is the only known species.

1. **C. Griffithii,** *Benth. in Benth. & Hook. Gen. Pl.* i. 213.

MALACCA, *Griffith.*

Leaves 2½–3 in., glabrous, acuminate, base rounded; petiole ½ in. *Flowers* ¼ in. diam., produced from the old wood, covered with scales.

ORDER XXVII. **STERCULIACEÆ.** (By Maxwell T. Masters, F.R.S.)

Herbs, shrubs (rarely climbing), or trees, herbaceous portions usually more or less pubescent. *Bark* usually abounding in mucilage, inner fibrous. *Leaves* alternate, simple, lobed or digitate, stipulate. *Inflorescence* axillary or terminal, usually cymose. *Flowers* regular, uni- or bisexual. *Sepals* 5, more or less connate, rarely completely so. *Petals* 5 or 0. *Andrœcium* columnar or tubular, of many stamens, or rarely stamens few, free; anthers in heads, or in a single ring at the apex of the column, or dispersed on the outside of the tube, or arranged along the edge of a cup or tube, with intervening staminodes or sterile stamens; anther-cells always 2, parallel or divergent. *Ovary* free, 2–5-celled, rarely of 1 carpel, sessile or stalked; styles consolidated, or as many as the cells of the ovary. *Ovules* many or few, attached to the inner angle of the carpels, anatropous, ascending or horizontal, raphe ventral or lateral. *Fruit* dry or fleshy, dehiscent or indehiscent. *Seeds* sometimes arillate, albuminous or exalbuminous; cotyledons leafy, flat, folded or convolute, radicle pointing in various directions in different species.—DISTRIB. Abundant in the tropics of either hemisphere and in subtropical Africa and Australia. Genera 40–45; species between 500 and 600, largely represented in India and its islands, to which 2 or 3 genera and numerous species are peculiar.

TRIBE I. **Sterculieæ.** *Flowers* unisexual or polygamous. *Petals* 0. *Andrœcium* columnar or sessile; anthers clustered or disposed in a ring.

* *Anthers numerous.*

Ovary with 2 or more ovules in each cell; fruit dehiscent . . .	1. STERCULIA.
Ovarian cells 1-ovuled; fruit indehiscent	2. TARRIETIA.

** *Anthers* 5, *whorled; fruit indehiscent.*

3. HERITIERA.

TRIBE II. **Helictereæ.** *Flowers* hermaphrodite. *Petals* deciduous. *Andrœcium* columnar below, dilated above into a cup, on the margin of which are placed the anthers usually alternating with staminodes.

Anthers sessile	4. REEVESIA.
Anthers stipitate.	
Capsule membranous, inflated	5. KLEINHOVIA.
Capsule more or less woody, not inflated.	
Anther-cells divaricate; seeds not winged	6. HELICTERES.
Anther-cells parallel; seeds winged	7. PTEROSPERMUM.

TRIBE III. **Eriolæneæ.** *Flowers* hermaphrodite. *Petals* deciduous. *Andrœcium* tubular, conical, antheriferous for nearly its whole length; staminodes 0.

8. ERIOLÆNA.

TRIBE IV. **Dombeyeæ.** *Flowers* hermaphrodite. *Petals* flat, persistent. *Andrœcium* tubular, antheriferous at the margin; anthers solitary or in groups, alternating with staminodes.

Bracteoles caducous; anthers 15 . . . . 9. PENTAPETES.
Bracteoles persistent; anthers 5 . . . . 10. MELHANIA.

TRIBE V. **Hermannieæ.** *Flowers* hermaphrodite. *Petals* marcescent, flat. *Andrœcium* tubular at the base only; stamens 5, staminodes 0.

Ovary 5-celled . . . . 11. MELOCHIA.
Ovary of 1 carpel . . . . 12. WALTHERIA.

TRIBE VI. **Buettnerieæ.** *Petals* concave at the base. *Andrœcium* tubular; anthers marginal, solitary or in groups between the staminodes.

* *Stamens* 1-*seriate, anthers* 2–4 *between each staminode.*

Petals with a stipitate ovate blade . . . . 13. ABROMA.
Petals with a linear 2-fid blade . . . . 14. GUAZUMA.

** *Stamens* 1-*seriate, anthers solitary between each staminode.*

Petals with an entire or 3-fid blade; staminodes short-obtuse . 15. BUETTNERIA.
Petals with a linear blade; staminodes linear-lanceolate . . . 16. COMMERSONIA.

*** *Stamens pluriseriate, petals orbicular without appendage.*

17. LEPTONYCHIA.

1. **STERCULIA,** Linn.

Trees or shrubs. *Leaves* simple, palmately lobed or digitate. *Inflorescence* panicled, axillary or terminal. *Flowers* polygamous. *Calyx* tubular, 4–5-parted, often coloured. *Petals* 0. *Staminal column* bearing a head or ring of sessile, 2-celled anthers. *Pistil* sessile or stipitate, of 4–5 carpels opposite the sepals, each 2–many-ovuled; styles connate at the base, stigmas as many as the carpels, free, radiating. *Ripe carpels* distinct, follicular, sessile or stipitate, woody or membranous. *Seeds* 1 or many, naked, sometimes arillate, sometimes winged; albumen bipartite, flat or folded; cotyledons flat, thin, adhering to the albumen, or thick and fleshy; radicle near to or remote from the hilum.—DISTRIB. A genus of about 60 species, natives of the tropics of both hemispheres, but specially abundant in tropical Asia.

SECT. I. **Eusterculia,** *Endl. Follicle* coriaceous or woody. *Radicle* remote from the hilum.

* Leaves digitate.

1. **S. fœtida,** *L.; DC. Prodr.* i. 483; leaflets 7–9 elliptic-lanceolate adult glabrous beneath, calyx deeply 5-parted. *Br. in Benn. Pl. Jav. Rar.* 227; *Cav. Diss.* v. t. 141; *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 155; *W. & A. Prodr.* i. 63; *Wall. Cat.* 1137; *Wight Ic.* t. 181, 364; *Thwaites Enum.* 29; *Miquel Flor. Ind. Bat.* i. pt. ii. p. 172.—*Rumph. Herb. Amb.* iii. t. 107.

WESTERN PENINSULA, in the Concan, Malabar; BIRMA, CEYLON.—DISTRIB. East tropical Africa, Moluccas, North Australia.

A tall tree. *Branches* whorled, horizontal. *Leaves* crowded at the ends of the branches; leaflets about 6 by 2 in., pubescent when young; petiole 8 in.; stipules ensiform, caducous. *Panicles* erect, ∞-flowered, spreading (formed immediately under the young leaves of the present year, *Roxb.*), branches glabrous, ultimate pedicels shorter than the flower, jointed in the middle. *Bracteoles* minute. *Calyx* $\frac{1}{2}$–$\frac{3}{4}$ in. diam., dull orange coloured, campanulate, deeply 5-parted; lobes oblong-lanceolate, spreading, villous within, much longer than the tube. *Anthers* 12–15. *Carpels* 5, downy; style curved. *Follicles* as large as the fist, woody, oblong, boat-shaped, shortly beaked, nearly glabrous. *Seeds* 10–15, the size of filberts, black, smooth; albumen 0; cotyledons thick, fleshy, 5-nerved, plumule developed.—The seeds are roasted and eaten as chestnuts.

2. **S. versicolor,** *Wall. Pl. As. Rar.* i. 48, t. 59; leaves peltate digitate, leaflets 5–7 oblong acuminate pubescent beneath, calyx-lobes inflexed connivent at the tips. *Wall. Cat.* 1129. *Br. in Benn. Pl. Jav. Rar.* 227.

BIRMA, on limestone rocks, by the banks of the Irrawaddy, near Segaen, *Wallich.*

A tree 16 ft. *Trunk* thick, bark grey. *Branches* spreading. *Leaflets* 5–7 by 2–2½ in., glabrous above, whitish-pubescent beneath; petiole 6–8 in., dilated at the apex. *Panicles* at the ends of the branches, erect, shorter than the petioles. *Flowers* ∞, small, fragrant, orange-yellow, pedicelled. *Calyx* ¼ in., campanulate, segments oblong. *Staminal column* curved. ♀ fl.: ovary pedicelled, 5-furrowed, villous; style short, villous, stigma subpeltate, 5-lobed, lobes obtuse.

** Leaves palmately lobed.

3. **S. urens,** *Roxb. Hort. Beng.* 50; *Cor. Pl.* i. 25, t. 24; *Fl. Ind.* iii. 145; leaves 5-lobed velvety beneath, panicles erect, follicles armed with sharp bristles. *W. & A. Prodr.* i. 63; *Wall. Cat.* 1120 *in part*; *Dalz. & Gibs. Bomb. Fl.* 23; *Thwaites Enum.* 29; *Br. in Benn. Pl. Jav. Rar.* 227. *Miq. Fl. Ind. Bat.* i. pt. 2, 172. Cavallium urens, *Schott & Endl. Melet.* 33.

NORTH-WEST INDIA, ASSAM, BEHAR, EASTERN and WESTERN PENINSULAS, CEYLON.

A soft-wooded tree, with white papery outer bark, inner fibrous. *Trunk* erect. *Branches* spreading, marked with large scars. *Leaves* about the ends of the branches, 9–12 in. long and broad, rounded, base cordate, lobes entire acuminate; petiole 6–9 in. *Panicle* dense, terminal, ∞-flowered, glandular-pubescent. *Flowers* small, yellow, ♀ mixed with many ♂. *Calyx* ¼ in. diam., campanulate, 5-parted, lobes acute, spreading. *Filaments* 10. *Follicles* 5, oblong, radiating, yellow pubescent, with stinging hairs intermixed. *Seeds* 3–6, oblong, black. Yields a colloid gum, and the seeds are roasted and eaten.—In Wallich's herbarium, under number 1120 D, E, F (*S. urens*), are fragments of two or three species intermixed, with no indication of the proper letters pertaining to each, the leaves are digitate, glabrous above, pubescent beneath, there are flowers of two species, and fruits which may be those of *S. villosa.* The name *S. urens* cannot be properly applied to any of these fragments.

4. **S. villosa,** *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 153; leaves 5–7-lobed velvety beneath and with spreading villi, panicles pendulous, follicles downy. *Wall. Cat.* 1136, 2, 3, D.; *W. & A. Prodr.* i. 63; *Dalz. & Gibs. Bomb. Fl.* 22; *Br. in Benn. Pl. Jav. Rar.* 227.

NORTH-WESTERN INDIA, BENGAL and MALABAR, and the tropical Himalaya from Kumaon eastwards.

A tree with white bark. *Branches* few, spreading, with large scars. *Leaves* 12–18 in. each way, glabrescent or thinly stellate-pilose above, base cordate, deeply palmately 5–7-lobed, lobes acuminate, sometimes 3-fid; petiole as long as the leaf, expanded and very downy at the top; stipules lanceolate, acuminate. *Panicle* 12–14 in., deflexed, much branched, rusty pubescent. *Bracts* filiform, caducous. *Flower-buds* globose. *Flowers* ∞, ♂ and ♀ mixed, the former most numerous. *Calyx* ½ in. diam., broadly campanulate, downy outside, pinkish within, 5-lobed, lobes spreading. *Anthers* 10. *Ovary* globose, style recurved. *Follicles* 1½–2 in., oblong, spreading, rusty-villous. *Seeds* oblong, black; albumen bipartite; cotyledons thin.

*** Leaves simple, not lobed, 1-nerved.

† *Calyx-lobes broad, spreading.*

5. **S. guttata,** *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 148; leaves glabrous above pubescent beneath oblong-ovate acute or acuminate base rounded or subcordate, panicles sparingly branched. *Wall. Cat.* 1127, *in part*;

W. & A. Prodr. i. 62; *Wight. Ic.* t. 487; *Thwaites Enum.* 29; *Dalz. & Gibs. Bomb. Fl.* 23; *Beddome Fl. Sylvat.* t. 105; *Br. in Benn. Pl. Jav. Rar.* 229. S. cuneata, *Heyne ms. in Wall. Cat.* 1127³. S. alata, *Wall. Cat.* 1127 D, not of others.—*Rheede Hort. Mal.* iv. t. 61.

WESTERN PENINSULA, Concan, Nilghiri Mts.; Malabar; EASTERN PENINSULA, at Malacca and the ANDAMAN ISLES; CEYLON, Ambagamowa district.

A tree. *Trunk* straight. *Bark* cracked, ash-coloured, inner fibrous. *Young shoots* pubescent. *Leaves* 7–8 by 4 in., scabrid above, nerves stellate-pilose beneath; petiole 2 in., thinly stellate pilose; stipules ensiform, caducous. *Panicle* equalling the leaves, branches horizontal, rusty-tomentose; ultimate pedicels shorter than the flowers. *Bracts* lanceolate. *Flower-buds* globose. *Flowers* chiefly ♂. *Calyx* ⅓ in., densely rusty-downy outside, glandular within, campanulate, 5 fid; segments broadly ovate-acute, ultimately reflexed, covered with long hairs. *Anthers* 12. *Ovary* stalked, globose, 3–5-lobed. *Style* curved, stigma 3–5-lobed. *Follicles* 1–5, size of a small apple, each about 3 in., obovoid, covered with reddish down, smooth, pink within. *Placentas* villous. *Seeds* oblong; testa black, brittle; between it and the second coat, which is brown and tough, is a soft white sebaceous substance, innermost coat thin, membranous; albumen amygdaloid; cotyledons elliptic.

Brown, l.c., makes two vars., α with oblong ovate acute leaves; and β with obovate acuminate leaves and racemes much shorter than the leaves.—Cloth is made from the bark in Malabar.

6. **S. Roxburghii,** *Wall. Cat.* 1124; leaves glabrous oval or oblong-lanceolate suddenly acuminate base rounded, racemes erect shorter than the leaves. *Wall. Pl. As. Rar.* 262; *Br. in Benn. Pl. Jav. Rar.* 229. S. lanceæfolia, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 150, *not of Cav.* S. ovalifolia, *Wall. Cat.* 1132. S. alata, *Wall. Cat.* 1125. in part.

TEMPERATE HIMALAYA, ascending in Sikkim 6000 ft., *J. D. H.*; SILHET and ASSAM.

A tree. *Bark* ashy. *Leaves* 4–8 by 1–3 in., lanceolate; petiole ½–1 in., thickened at both ends; stipules subulate. *Racemes* 2 in., axillary, few-flowered, pedicels erecto-patent sparingly stellate-pilose. ♂ fl. most numerous. *Calyx* ½ in. diam., scarlet, campanulate, 5-parted, segments oblong-lanceolate, spreading, longer than the tube. *Follicles* 1–5, 3 in., lanceolate, beaked, downy-scaberulous, pink. *Seeds* 4–8, black, ovoid, coats as in *S. guttata* (Roxb.), albumen scanty; cotyledons thick.—Wallich's *S. ovalifolia* only differs in its oval leaves.

7. **S. parvifolia,** *Wall. Cat.* 1123; leaves glabrous lanceolate base tapering, racemes simple shorter than the leaves. *Br. in Benn. Pl. Jav. Rar.* 229.

MALACCA and PENANG, *Porter*, &c.

A small tree. *Branches* glabrous, purplish, bark cracking, leaving whitish striæ. *Leaves* 4–6 by 1½ in.; petiole 2 in., thickened at the apex. *Racemes* axillary, shorter than the leaf. *Flowers* red. *Follicles* 2 in., downy, oblong. *Seeds* black.—Specimens imperfect.

8. **S. striatiflora,** *Mast.*; leaves glabrous oblong-acute base tapering, panicle branched shorter than the leaves, calyx funnel-shaped striated.

BIRMA, *Griffith.*

A shrub. *Leaves* 8–18 by 4–6 in., leathery, arch-veined, midrib prominent; petiole 1 in.; stipules subulate. *Branches of panicles* erecto-patent, ultimate pedicels shorter than the flowers. *Bracteoles* minute. *Calyx* ½ in., glabrous, pink externally, longitudinally striated; lobes linear, erecto-patent.—Imperfect specimens only seen.

9. **S. macrophylla,** *Vent. Hort. Malm.* ii. n. 91, *in note*; leaves glabrous above tomentose beneath suborbicular quite entire base deeply cordate, calyx-lobes triangular. *Br. in Benn. Pl. Jav. Rar.* 230.

MALACCA, *Maingay*.—DISTRIB. Java.

A large tree. *Leaves* 12–16 by 10–12 in., venation arched, secondary veins proceeding nearly to the margin before arching; petiole downy, 6 in. *Panicles* deflexed, much branched, nearly equalling the leaves, ultimate pedicels capillary, shorter than the flowers, pubescent and hispid. *Flower-buds* minute, subglobose. *Calyx* $\frac{1}{8}$ in., cup-shaped, stellate-hairy, 5 fid; lobes triangular, erect, shorter than the tube. *Follicle* 2 in., downy, smooth within.

10. **S. linguifolia,** *Mast.*; leaves glabrous oblong-obtuse base rounded 1-nerved, racemes slender pendulous shorter than the leaves, calyx-lobes linear subulate 3–4 times longer than the tube.

TAVOY, *Parish*.

A shrub, 6 ft. *Leaves* 7–8 by 2 in., coriaceous; petiole $1\frac{1}{2}$ in. *Flower-buds* lanceolate. *Calyx* $\frac{3}{4}$ in., salmon-coloured; lobes slightly ciliated externally, free at the tips, much longer than the tube.—Imperfect specimens only seen.

11. **S. pubescens,** *Mast.*; leaves glabrous above pubescent beneath oblong obtuse or abruptly acuminate base cordate, panicle erect, calyx campanulate lobes triangular acute.

MALACCA, *Maingay*.

A tree, younger portions rusty-pubescent. *Leaves* 4–6 by $2–2\frac{1}{2}$ in., nerves stellate-hairy beneath; petiole $1\frac{1}{4}$ in., sulcate striated; stipules $\frac{1}{4}$ in., subulate. *Panicle* much branched, as long or longer than the leaves; ultimate pedicels jointed, pubescent, spreading. *Calyx* $\frac{1}{4}$ in., segments hairy within, equalling the tube. *Ovary* globose, downy, style deciduous.

12. **S. armata,** *Mast.*; leaves glabrous above downy beneath oblong acute base rounded nerves hispidulous, panicle erect, calyx broadly campanulate lobes ovate-lanceolate.

BHOTAN, *Griffith*.

A tree. *Bark* grey, marked with very large cordiform scars. *Leaves* crowded at the ends of the branches, 5–6 by 2 in.; petiole $\frac{3}{4}$ in., rusty-hispid; stipules $\frac{1}{4}–\frac{1}{2}$ in., deltoid-lanceolate, striate. *Panicle* as long as or longer than the leaves, erect or ascending, many-flowered; pedicels subpilose, as long as the flowers. *Flower-buds* oblong. *Calyx* $\frac{3}{4}$ in. diam., pink, 5-fid; lobes spreading, longer than the bell-shaped tube. *Fruit* not seen.

†† *Calyx-lobes narrow incurved, frequently cohering at the tips, gaping at the sides.*

13. **S. lævis,** *Wall. Cat.* 1138; leaves lanceolate acuminate glabrous base tapering, panicles erect, nearly the length of the leaves, calyx subglobose, segments broadly lanceolate. *Br. in Benn. Pl. Jav. Rar.* 230; *Miq. Fl. Ind. Bat.* i. pt. 2, 174. S. coccinea, *Jack Mal. Misc.* i. 286, *not of Roxb.*

PENANG, *Wallich*; MALACCA, *Maingay*; PEGU, *Kurz*.—DISTRIB. Java.

A small tree. *Leaves* 6–7 by $1\frac{1}{2}–2\frac{1}{2}$ in.; petiole $1\frac{1}{2}–2$ in., thickened at the apex. *Peduncles* very slender, ultimate pedicels spreading, as long as the flower. *Bracteoles* very minute, subulate. *Flower-buds* oblong. *Flowers* $\frac{1}{2}–\frac{3}{4}$ in.; calyx-lobes linear from a broad base, much longer than the tube, glabrous without, bearded within. *Follicles* $1\frac{1}{2}$ in., woody, downy externally, smooth and crimson within, tip beaked. *Seeds* small, oblong, black, shining.

14. **S. coccinea,** *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 151; leaves glabrous lanceolate abruptly acuminate base tapering, panicles lax drooping, calyx-segments deltoid below linear-lanceolate above 4–5 times longer than the tube.—*Wall. Cat.* 1122, C; *Br. in Benn. Pl. Jav. Rar.* 230. S. lanceolata, *Ham. in Wall. Cat.* 1122.

TROPICAL EASTERN HIMALAYA; Sikkim, 3–6000 ft., *J. D. H.; BHOTAN, Griffith;* ASSAM, and the KHASIA MTS.

A small tree. *Leaves* 4–8 by 1–3 in., quite entire, sometimes with scanty stellate hairs beneath; petiole 1 in., hairy, apex thickened; stipules subulate. *Panicles* equalling the leaves, ultimate pedicels capillary, as long as the flowers. *Bracteoles* subulate. *Flower-buds* lanceolate from a broad base; ♂ flowers 1½ in. diam., green externally, pink within. *Sepals* incurved, woolly tips coherent or free, sometimes spreading. *Follicles* 4–5 in., lanceolate, beaked, downy externally, crimson on both surfaces. *Seeds* 4–8, ovoid, smooth, albumen scanty, bipartite.—On some specimens dimorphic male fl. may be seen, the majority similar to those above described, others in which the sepals are united for the greater part of their length, forming a distended, somewhat fleshy, pink, accrescent bell-shaped calyx, ultimately attaining a length of 2 in. This hypertrophy may be the result of insect or fungus growth.

15. **S. nobilis,** *R. Br. in Benn. Pl. Jav. Rar.* 231; leaves glabrous oblong acuminate, panicles pendulous, calyx-segments as long as the bell-shaped tube linear incurved. *Miq. Fl. Ind. Bat.* i. part 2, 175. S. Balanghas, *Roxb. Fl. Ind.* iii. 144, *not of Willd.*; *Wall. Cat.* 1118, B, C, E. Southwellia nobilis, *Salisb. Par. Lond.* t. 69.

MALABAR, at Quilon, *Wight;* doubtful if wild.—DISTRIB. China and Sumatra.

A tree; bark brown. *Leaves* 2–12 by 2–6 in.; petiole 1 in. *Panicles* lax, axillary, many-flowered; ultimate pedicels filiform, glabrous, spreading horizontally. *Flower-buds* fusiform. ♂ flowers ½ in. diam., fragrant, campanulate, hoary-tomentose outside, red within. *Staminal column* slender, curved. ☿ flowers few. *Ovary* very hairy, stipitate, 5-lobed, style curved. *Follicles* woody, ovoid, beaked. *Seeds* few, testa dark chestnut, clammy, inner coat coriaceous, dull black; albumen 0; cotyledons thick.—Seeds eaten as chestnuts.

16. **S. Balanghas,** *L.; Br. in Benn. Pl. Jav. Rar.* 231, *not of Roxb.*; leaves pubescent beneath oblong-ovate obtuse acuminate or lanceolate base rounded not cordate, panicle erect or nodding as long as the leaves, flowers globular, sepals as long as the hispid bell-shaped tube, stigmas long. *Wall. Cat.* 1118, D; *Wight, Ill.* t. 30; *W. & A. Prodr.* i. 62; *Thwaites Enum.* 29. —*Rheede Hort. Mal.* i. t. 49.

Throughout the HOTTER PARTS OF INDIA and in CEYLON.

A tree; herbaceous portions rusty-tomentose. *Leaves* 5–6 by 3 in.; petiole 1½–2 in.; stipules subulate. *Panicle* stellate-hairy; pedicels longer than the flowers. *Flower-buds* ovate, obtuse. *Calyx* globose ½ in. diam., downy outside, hispid within, 5-cleft to the middle, segments connivent. *Stigmas* recurved, as long as the style. *Follicles* 3 in., woody, oblong acuminate, covered with rusty down. *Seeds* oblong, black.

VAR. 1. *mollis;* leaves elliptic-oblong, panicles nodding, pedicels capillary pilose, spreading. S. mollis, *Wall. Cat.* 1131, 1426, 1427; *Br. in Benn. Pl. Jav. Rar.* 231.—Bhotan and the Eastern Peninsula. More densely pubescent than the type, but otherwise hardly distinguishable.

VAR. 2. *angustifolia;* leaves narrow lanceolate, panicle spreading or ascending, pilose. S. angustifolia, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 148; *Wall. Cat.* 1133; *Br. in Benn. Pl. Jav. Rar.* 231.—North-Western provinces, Nipal and Mergui. Roxburgh describes the panicle as pendulous: I always find it ascending in herbarium specimens.

VAR. 3. *glabrescens;* leaves glabrescent beneath. Mergui, *Griffith.*

17. **S. rubiginosa,** *Vent. Hort. Malm.* ii. 91, *in note;* leaves oblong acute or abruptly acuminate glabrous above downy beneath base rounded stipules very long, panicle erect, calyx-lobes as long as the tube, stigmas short. *Br. in Benn. Pl. Jav. Rar.* 232; *Miq. Fl. Ind. Bat.* i. pt. 2, 175. S. angustifolia, *Jack Mal. Misc.* i.; *Hook. Bot. Misc.* i. 287. S. Jackiana, *Wall. Cat.* 1134.

BIRMA and the EASTERN PENINSULA.—DISTRIB. Java.

A tree; herbaceous portions rusty-villous. *Leaves* 8–10 by 2½ in., nerves rusty-hispid beneath; petiole ¼–½ in., hispid; stipules 1 in., subulate-lanceolate. *Panicle* scarcely equalling the leaves, laxly hispid, many-flowered; ultimate pedicels spreading, scarcely exceeding the flowers. *Flower-buds* short, broadly ovate, acute. *Calyx* ¼ in. long, subglobose, lobes linear-subulate, incurved or spreading, hispid. *Follicles* 2 in., lanceolate, beaked, downy externally, crimson inside. *Seeds* ½ in. long, black.

18. **S. ensifolia,** *Mast.;* leaves lanceolate acute at both ends apex gradually acuminate stipules half the length of the petiole, panicles erect half the length of the leaves, calyx-lobes much exceeding the tube, stigmas short.

PENANG, *Philips;* MERGUI, *Griffith.*

A tree. *Leaves* 8–10 by 2½ in., glabrous above, pubescent beneath, nerves rusty-hispid beneath; petiole ¾–1 in., densely rusty-tomentose; stipules filiform, half the length of the petioles. *Panicle* few-flowered; ultimate pedicels shorter than the flower, rusty-tomentose. *Flower-buds* ovate-lanceolate. *Calyx* nearly ½ in.; lobes linear-lanceolate, sparingly hispid at the edges. *Ovary* 5-lobed, hispid; style curved, stigma-lobes rounded, short, radiating. *Follicles* downy, curved, lanceolate, beaked.

19. **S. parviflora,** *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 147; leaves oblong-ovate acuminate glabrescent above slightly pubescent beneath base subcordate, panicles spreading as long as the leaves, calyx minute, tube urceolate 5-toothed teeth inflexed. *Wall. Cat.* 1121; *Br. in Benn. Pl. Jav. Rar.* 232.

SILHET, *Wallich;* MALACCA and PENANG, *Maingay,* &c.

A large tree. *Leaves* 4–6 by 2½–4 in.; petiole 1½ in., apex thickened. *Panicle* stellate hairy; ultimate pedicels as long as the calyx, capillary, pilose. *Calyx* ¼ in., yellowish; tube longer than the 5, appressed, connivent lobes. *Ovary* globose, 5-lobed; style short. *Follicles* 2 in., downy, oblong, beaked. *Seeds* oblong, black, albumen bipartite.

20. **S. bicolor,** *Mast.;* leaves oblong-acute glabrescent above hoary tomentose beneath base rounded or subcordate midrib rusty subpilose beneath, calyx-lobes linear incurved as long as the campanulate tube.

MALACCA, *Maingay.*

A tree 40–50 ft. *Leaves* 3–4 by 1½ in., coriaceous, 1-nerved, entire; petiole 1½ in., striate. *Panicle* many-flowered, shorter than the leaves; branches spreading or deflexed, rusty-tomentose; ultimate pedicels longer than the flowers. *Calyx* ¼ in., 5-fid to the middle.

21. **S. Maingayi,** *Mast.;* leaves obovate oblong abruptly acuminate glabrous base cordate, panicle erect or spreading equalling the leaves, calyx-lobes linear as long as the campanulate downy tube.

MALACCA, *Maingay.*

A lofty tree. *Leaves* 8–9 by 3–4 in.; petiole 3 in. *Panicle* erect, many-flowered; pedicels spreading, pubescent, longer than the flowers. *Flowers* ¼ in. long, urceolate-campanulate. *Follicles* 3–4 in., oblong, acuminate, downy externally. *Seeds* ¾ in. oblong, black; albumen and cotyledons fleshy.

SECT. II. **Firmiana,** *Marsili; Br. in Benn. Pl. Jav. Rar.* 235 (gen.). *Follicles* membranous, opening long before maturity. *Seeds* two or more; embryo transverse, radicle inferior.

22. **S. colorata,** *Roxb. Hort. Beng.* 50; *Cor. Pl.* i. 26, t. 25; *Fl. Ind.* iii. 146; leaves glabrescent roundish palmately lobed lobes acuminate, calyx tubular club-shaped covered with orange coloured down. *Wall. Cat.*

1119, F.; *Hook. Ic. Pl.* 143; *Dalz. & Gibs. Bomb. Fl.* 23; *W. & A. Prodr.* i. 63. S. rubicunda, *Wall. Cat.* 1119, D, F, G. Firmiana colorata, *Br. in Benn. Pl. Jav. Rar.* 235; *Thwaites Enum.* 29. Erythropsis Roxburghiana, *Schott & Endl. Melet. Bot.* 33.

EASTERN BENGAL; PEGU, the WESTERN PENINSULA, and CEYLON.

A large tree; trunk erect, bark ashy, branches spreading. *Leaves* 6–9 by 5–12 in., about the ends of the branches, base cordate, 3-lobed, lobes triangular acuminate; petiole 4–9 in.; stipules erect, lanceolate. *Panicle* terminal, coral-like, many-flowered; pedicels covered with orange-red tomentum. *Calyx* ¾ in., tube 4 times longer than the rounded rather obtuse lobes, orange-downy outside, pilose within; anthers 30, reniform. *Styles* recurved. *Follicles* 2–3 in., stipitate, glabrous, membranous. *Seeds* ovoid, smooth or wrinkled, of the size of a field bean.—Brown, l.c., admits 3 varieties: Var. 1, with furfuraceous calyx, tube nearly 4 times longer than the lobes. Var. 2 is *S. fulgens*, Wall. Var. 3 has calyx-lobes covered with loose spreading stellate hairs, tube scarcely three times longer than the lobes.

23. **S. fulgens,** *Wall. Cat.* 1135; leaves cordate angular obscurely lobed scabrid above pubescent beneath, calyx downy cylindric tubular curved. *Wall. Cat.* 11192. Firmiana colorata var. β, *Br. in Benn. Pl. Jav. Rar.* 235; *Miq. Fl. Ind. Bat.*, i. pt. 2, 178.

TROPICAL WESTERN HIMALAYA; Kumaon, alt. 2500 ft., *Strach. & Wint.;* Garwhal, *Falconer;* BIRMA and the EASTERN PENINSULA.—DISTRIB. Java.

A small tree. *Leaves* ample, 10 by 6 in., coriaceous; petiole pubescent, 12–18 in. *Panicle* erect, branches covered with rusty-stellate down, many-flowered. *Flowers* ½–¾ in., produced before the leaves, covered with yellowish down. *Calyx-lobes* ovate, acute, 3–4 times shorter than the tube. *Follicles* stipitate.

24. **S. linearicarpa,** *Mast.*; leaves glabrescent cordate suborbicular, panicle erect, peduncles thick compressed pilose, flowers dense, calyx tubular-campanulate pilose lobes ovate acute, follicles linear-lanceolate yellow downy.

MALACCA, *Maingay.*

A tree. *Leaves* 6–12 in. each way, ample, coriaceous, entire, 7-nerved, nerves prominent beneath; petiole 3–8 in., apex thickened. *Panicle* terminal, erect, many-flowered, rusty-pubescent, as long as the leaves; pedicels spreading, jointed. *Flower-buds* globose. *Calyx* ¼–½ in., tube cylindric, limb rotate-campanulate; lobes as long as the tube. *Staminal column* slender. *Follicles* 3–4 in.

SECT. III. **Pterygota,** *Endl.* (gen.). *Follicles* woody. *Seeds* many, winged at the apex, albuminous, radicle next the hilum.

25. **S. alata,** *Roxb. Hort. Beng.* 50; *Pl. Cor.* iii. 84, t. 287; *Fl. Ind.* iii. 152; leaves cordate ovate acute glabrous, flowers nearly 1 in. floccose tomentose, wing of seed large spongy. *Wall. Cat.* 1125. Pterygota Roxburghii, *Schott & Endl. Melet.* P. alata, *Br. in Benn. Pl. Jav. Rar.* 234. S. coccinea, *Wall. Cat.* 1122 partly. S. Heynii, *Beddome Flor. Sylvat.* t. 230.

SILHET and CHITTAGONG, *Roxburgh;* WESTERN PENINSULA; TINNEVELLY, *Heyne.*

A large tree; herbaceous portions covered with dense golden pubescence. *Bark* ash-coloured. *Leaves* 4–10 by 3–7 in., clustered about the ends of the branches, submembranous, 7-nerved; petiole 1–4 in.; stipules subulate. *Panicles* from the leafless axils, few-flowered, shorter than the leaves. *Bracteoles* caducous. *Calyx* campanulate, densely tomentose, deeply 5-parted, segments linear-lanceolate. *Staminal column* ¾ the length of the calyx. ♀ flowers: *ovaries* 5, sessile; style recurved; ovules numerous. *Follicles* 5, 5 in. diam., globose, depressed, woody, clothed with mealy pubescence outside, corky within. *Seeds* many, oblong, compressed, wing 2 in. and upwards by 1½ in.; cotyledons not separable from the mealy albumen, radicle next the hilum.—

Col. Beddome, who gives a good description and figure of this plant, suggests, with reason, that this is the true *S. alata* of Roxburgh. The latter author says there is no albumen, but this is an oversight.

26. **S. Thwaitesii,** *Mast.*; leaves glabrous oblong acute base rounded, ♂ fl. $\frac{1}{3}$–$\frac{3}{4}$ in., ♀ nearly $\frac{1}{2}$ in., wing of seed membranous scarcely spongy. Pterygota alata, *Thwaites Enum.* 29.

CEYLON; Banks of the Mahawelliganga, at Haragam, *Thwaites.*

A tree. *Leaves* 4–5 by 2 in., glabrescent, coriaceous; petiole 1–4 in. *Panicles* axillary, as long as the petiole. *Flowers* pubescent. *Calyx* divided half-way down; lobes ovate, acute, as long as the bell-shaped tube. *Staminal-column* slender, $\frac{1}{3}$ shorter than the calyx. ♀ fl.: *ovaries* 3, with staminodes at the base; styles 3; ovules ∞. *Follicles* 3 by 2 in., woody, oblong, obtuse. *Seed* obovate, wing terminal, oblong, truncate, twice the length of the seed.

SECT. IV. **Hildegardia,** *Endl.* *Follicles* membranous, winged at the top, ultimately dehiscent. *Seeds* albuminous, radicle next the hilum.

27. **S. populifolia,** *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 148; leaves glabrous rounded cordate acuminate, carpels ovate ventricose terminated by a membranous oblique obtuse cultriform wing. *Wall. Pl. As. Rar.* i. 3, t. 3, *Cat.* 1128. S. populifolia, *W. & A. Prodr.* i. 62. Hildegardia populifolia, *Br. in. Benn. Pl. Jav. Rar.* 235.

WESTERN PENINSULA; Coromandel, *Roxburgh.*

A tree. *Bark* smooth; young *branches* like those of a poplar, angular. *Leaves* 3–4 by 4 in., 7-nerved; petiole 2–6 in. *Panicles* axillary and terminal, shorter than the leaves; branches angular, glabrous, spreading; ultimate pedicels shorter than the flowers. *Flower-buds* oblong. *Calyx-segments* $\frac{1}{4}$ in., free nearly to the base, linear-spathulate, downy externally. *Ovary* hispid, ovoid, tapering into a short style, stigma 5-lobed. *Follicle* solitary. Seeds oblong, $\frac{3}{4}$ in. long.—De Candolle's var. *acutiuscula* (Prodr. i. 483) differs in its more acutely pointed leaves, but is scarcely separable even as a variety.

SECT. V. **Scaphium,** *Endl.* *Anthers* 10–15. *Stigmas* lobed, subcapitate. *Follicles* large, leafy, boat-shaped, dilated at the base, opening long before maturity. *Seed* solitary, albuminous, radicle next the hilum.

28. **S. scaphigera,** *Wall. Cat.* 1130; leaves glabrous, oblong-lanceolate 1-nerved, calyx campanulate 5-parted lobes reflexed. Scaphium Wallichii, *Br. in. Benn. Pl. Jav. Rar.* 236.

MARTABAN, *Wallich;* MALACCA, *Maingay.*

A lofty tree. *Leaves* 12–14 by 6 in., coriaceous, base rounded; petiole 4–5 in., thickened at the top. *Flowers* panicled. *Calyx* $\frac{1}{4}$ in., pilose. ♂ fl.: *stamens* 10–14; anthers pilose. ♀ fl.: *ovary* villous, on a long slender stalk, 2-celled, with a ring of sessile anthers at the base; style filiform, stigmas 2. *Follicles* at first pilose, ultimately 6–8 by 3–4 in., venoso-reticulate, 1–2-seeded. *Seeds* globose; cotyledons pale green.

29. **S. affinis,** *Mast.*; leaves glabrous oblong base truncate 5-nerved, branches of panicle downy flattened or angular, flowers very small.

MALACCA, *Maingay.*

A tree. *Leaves* 6–8 by 4–5 in., coriaceous, midrib striated beneath; petiole 3–4 in., apex thickened, striated. *Panicle* erect, as long as the leaves; *peduncles* thickly striated, angular, subpilose, spreading; ultimate pedicels downy, densely crowded. *Flower-buds* ovoid. *Flowers* $\frac{1}{4}$ in. *Calyx-lobes* ovate, longer than the funnel-shaped tube. *Follicle* a span long, falcate, leafy, glabrescent, shining within. *Seed* $\frac{3}{4}$ in., solitary, oblong, black.

SECT. VI. **Pterocymbium,** *Br. in Benn. Pl. Jav. Rar.* 219 (gen). *Flowers* sub-hermaphrodite. *Anthers* 10. *Styles* coherent, stigmas recurved. *Follicles* 4–6, membranous, opening long before maturity. *Seed* solitary, albuminous; radicle next the hilum. (Too nearly allied to *Scaphium.*)

30. **S. campanulata,** *Wall. mss.;* leaves cordate ovate entire glabrous above pubescent beneath 5-nerved, panicles terminal, calyx turbinate-campanulate, seed glabrous.—Pterocymbium javanicum, *Br. in Benn. Pl. Jav. Rar.* 219, t. 45; *Miq. Fl. Ind. Bat.* i. pt. 2, 179.

PEGU, *Kurz.*—DISTRIB. Java.

A tree 50–60 ft.; bark brownish. *Leaves* 4 by 3½ in.; petiole equalling or shorter than the leaves; stipules ¼ in., subulate, caducous. *Panicles* terminal, ascending, shorter than the leaf; pedicels jointed. *Bracteoles* caducous. *Calyx* smooth, coriaceous, divided half-way down; lobes lanceolate. *Staminal column* pubescent below. *Ovaries* 5, sessile, gibbous at the apex; styles short, cohering; stigmas filiform, recurved; ovules 2, collateral, erect, anatropal. *Follicles* 5–6, or fewer by abortion, stipitate, glabrous. *Seeds* spherical, testa crustaceous, wrinkled, innermost coat membranous, between the two a woolly substance is interposed (*Brown*).

31. **S. tubulata,** *Mast.;* leaves glabrous entire oblong abruptly acuminate, cymes terminal, calyx tubular-turbinate, follicles pilose 2 in., seeds pilose.

MALACCA, *Maingay.*

A tree. *Leaves* 6 by 2 in., coriaceous, 1-nerved, base rounded; petiole 1 in. *Cymes* panicled, as long as the leaves, flowers numerous. *Calyx* glabrous; lobes spreading, ovate-lanceolate, shorter than the tube. *Staminal column* slender, pilose; anthers in a ring, lobes parallel. *Ovaries* 5; styles inflexed, tips cohering. *Follicles* 5, 2–3 by 1 in., stipitate, oblong, acute, dilated at the base. *Seed* ovoid.

2. TARRIETIA, Blume.

Tall trees. *Leaves* digitate or simple, glabrous or scaly. *Flowers* unisexual, panicled. *Calyx* tubular, small, 5-toothed. *Petals* 0. *Staminal-column* short, bearing a ring of 10–15 very densely clustered anthers, cells parallel. *Ovary* of 3–5 nearly free carpels opposite the sepals; styles as many, short filiform, stigmatose within; ovules 1 in each cell. *Ripe carpels* of stellately spreading samaras with long falcate wings. *Seeds* oblong; albumen bipartible; cotyledons flat; radicle next the hilum.—DISTRIB. Known species 3 or 4, natives of Australia, Java, and the Malay Peninsula.

1. **T. simplicifolia,** *Mast.;* leaves simple oblong quite entire apex retuse slightly 2-lobed with an intervening mucro, cymes panicled as long as the leaves.

MALACCA, *Maingay.*

A tree. *Leaves* 6–7 by 3 in., coriaceous, glabrous, 1-nerved, feather-veined, nerves approximate; petiole 2 in., striate, apex thickened. *Cymes* many flowered. *Flower-buds* globose. *Calyx* clavate-campanulate, 5-toothed, downy externally. ♂ fl.: *staminal column* short; anthers annular, lobes parallel, globose. ♀ fl.: *ovary* 5-lobed, sessile; stigmas spreading. *Fruit* samaroid, 3 in., oblong, obliquely spathulate, glabrous.

3. HERITIERA, Aiton.

Trees. *Leaves* coriaceous, simple, scaly beneath. *Flowers* small, unisexual, in axillary panicles. *Calyx* 5-, rarely 4–6-toothed or cleft. *Petals* 0.

Anthers in a ring at the top of the column, cells 2, parallel. *Ovaries* 5–6, almost free; style short, stigmas 5 thick; ovules solitary in each cell. *Ripe carpels* woody, indehiscent, keeled or winged. *Albumen* 0; cotyledons thick; radicle next the hilum.—A genus of 4–5 species, natives of Tropical Asia, Africa and Australia.

1. **H. littoralis,** *Dryand. in DC. Prodr.* i. 484; leaves oblong base rounded or subcordate, ripe carpels smooth outer margin winged inner keeled. *W. & A. Prodr.* i. 63; *Roxb. Fl. Ind.* iii. 142; *Thwaites Enum.* 28; *Br. in Benn. Pl. Jav. Rar.* 237; *Miq. Fl. Ind. Bat.* i. pt. 2, p. 179; *Dalz. & Gibs. Bomb. Fl.* 22. H. Fomes, *Wall. Cat.* 1139, *partly;* H. macrophylla, hort. Balanopteris Tothila, *Gærtn. Fruct.* ii. 94, t. 99.—*Rheede Hort. Mal.* vi. t. 21.

Coasts of BENGAL and of the EASTERN and WESTERN PENINSULAS and CEYLON, extending inland as far as the Khasia hills and Cachar.—DISTRIB. Tropical coasts of the Old World.

A tree. *Leaves* 5–8 by 2–4 in., coriaceous, white beneath, with flat scales; petiole 1½–⅝ in.; stipules lanceolate, caducous. ♂ *flowers* small, in axillary much branched clusters, which are shorter than the leaves. *Calyx* nearly ¼ in., urceolate, 6-toothed, downy. *Column* short. Anthers 5. ♀ *flowers* larger than the ♂. *Calyx* bell-shaped. *Fruits* 1–4 in., oblong, woody, smooth or tubercled.

2. **H. Fomes,** *Buch. in Symes Ava Emb.* t. 28, (1800); leaves broadly lanceolate acuminate tapering at the base 1-nerved, ripe carpels obovate flattened furrowed on the inner edge winged on the outer. Balanopteris minor, *Gærtn. Fruct.* ii. t. 98, f. 2. Heritiera minor, *Roxb. Hort. Beng.* 50, *Fl. Ind.* iii. 142.

Abundant in the GANGETIC DELTA, extending inland to SILHET, and along the shores of the EASTERN PENINSULA.—DISTRIB. Borneo.

A tree. *Trunk* straight, often deeply grooved. *Leaves* 4–6 by 2 in., ashy beneath and scaly; petiole 1 in.; *panicles* axillary, half the length of the leaves, crowded, much branched, rusty-pubescent. *Flowers* small, ⅓ in., orange-coloured, bell-shaped.—Much used for firewood in Calcutta.

3. **H. Papilio,** *Beddome Flor. Sylvat.* t. 218; leaves lanceolate 3-nerved silvery and scaly beneath, flowers monœcious, ripe carpels winged. *Wall. Cat.* 7836.

TRAVANCORE and SOUTHERN CARNATIC, at Caurtallum and Tinnevelly, *Beddome.*

A lofty evergreen tree, all the young parts panicles and inflorescence clothed with a golden, soft, stellate tomentum. *Leaves* 3–5 by 1½–2 in., young downy on the upper surface, ultimately coriaceous, glabrous and shining beneath, permanently silvery and with close-set scales; petiole ¾–⅘ in.; stipules entire. *Panicles* axillary, much shorter than the leaves. ♂ fl.: *calyx* campanulate, 4–5-cleft. *Staminal column* slender, glabrous; anthers 4–5. ♀ fl.: *calyx* ¼ in., 5–6-cleft. *Carpels* 5–6, ultimately quite glabrous, with a pair of staminodes between each. *Stigmas* recurved. *Ripe carpel* samaroid, wing large, subdeltoid, membranous, like that of some butterflies (*Beddome*).

H. ATTENUATA, *Wall. Cat.* 1140; *Br. in Benn. Pl. Jav. Rar.* 237, is a species of *Niota.* (See *Rutaceæ.*)

4. REEVESIA, Lindl.

Shrubs or trees. *Leaves* simple. *Flowers* numerous, white, in terminal much branched cymes. *Calyx* campanulate or funnel-shaped, 5-fid. *Petals* clawed. *Staminal-column* adnate to the gynophore, bearing a globose head of 2-celled anthers, cells diverging, ultimately confluent. *Ovary* 5-lobed, 5-celled; stigma sessile, 5-lobed; ovules 2 in each cell, pendulous, anatropous; raphe turned away from the placenta. *Capsule* woody septicidally 5-valved. *Seeds* 1–2 superposed, ascending oblong, compressed, winged downwards, hilum lateral near the top; albumen fleshy; cotyledons flat, foliaceous, radicle inferior.—DISTRIB. 1 or 2 species, natives of Eastern Asia.

1. **R. Wallichii,** *Br. in Benn. Pl. Jav. Rar.* 231 *ad not.;* leaves thinly stellate hairy beneath oblong acuminate base rounded, calyx campanulate. Sterculia punduana, *Wall. Cat.* 2701; *Griff. Itin. Notes,* 73.

EASTERN TROPICAL HIMALAYA; KHASIA MTS., alt. 3000–4000 ft.; Bhotan, *Griffith;* Sikkim, *J. D. H.*

A tree 50 ft. *Leaves* 3 by 1¼ in., quite entire, 1-nerved, thinly stellate-hairy; petiole thickened at both ends; stipules deciduous. *Cymes* panicled, dense, from the axils of the fallen leaves, ultimate pedicels as long as the flowers, jointed, 2-bracteolate. *Flower-buds* pyriform. *Calyx* ⅙ in., at first closed, afterwards 5-fid. *Petals* white, spathulate, clawed, exceeding the calyx. *Staminal column* slender, longer than the flower, with 5 very short terminal divisions, each bearing 3 extrorse anthers; connective thick. *Carpels* pubescent; style very short. *Capsule* 1½–2 in., pendulous, woody, oblong, obtuse, 5-lobed, lobes keeled, septicidally dehiscent, ultimately separating through the dorsal suture also. *Seeds* pendulous.

2. **R. pubescens,** *Mast.;* leaves pubescent beneath oblong acuminate base cordate, flowers panicled, calyx funnel-shaped.

EASTERN TROPICAL HIMALAYA; Sikkim, *T. Anderson;* Bhotan, *Griffith.*

A tree; branches thinly sprinkled with stellate hairs. *Leaves* 4–5 by 2-2½ in., subcoriaceous, glabrescent above, pubescent beneath, nerves stellate hairy beneath; petiole 1 in. *Panicle* terminal, many-flowered, peduncles, pedicels, and calyx pubescent, ultimate pedicels shorter than the flower. *Calyx* ⅓ in., infundibuliform, 5-lobed, lobes broadly ovate acute. *Petals* pink, linear-spathulate, twice the length of the calyx. *Staminal column* stout, 4 times longer than the calyx. *Fruit* not seen.—Differs from *R. Wallichii* in its pubescent, cordate leaves, and larger flowers.

5. KLEINHOVIA, Linn.

A tree. *Leaves* palminerved, ovate, acuminate, quite entire. *Inflorescence* terminal, lax, cymose. *Bracteoles* small, ensiform. *Sepals* deciduous. *Petals* 5, unequal, upper with longer claws, margins involute. *Staminal column* dilated above into a bell-shaped, 5-fid cup, divisions each with 3 extrorse 2-celled anthers, cells divergent. *Ovary* inserted in the staminal cup, 5-lobed, 5-celled; style slender, stigma 5-fid. *Capsule* membranous, inflated, pyriform, loculicidally 5-valved. *Seeds* 1 or 2 in each cell, tubercled; albumen scanty or 0; cotyledons convolute; radicle next the hilum.—DISTRIB. One species only.

1. **K. Hospita,** *L.; DC. Prodr.* i. 488; *Wall. Cat.* 1152; *W. & A. Prodr.* i. 64; *Roxb. Fl. Ind.* iii. 141; *Dalz. & Gibs. Bomb. Fl.* 23; *Beddome Flor. Sylvat. Anal. Gen.* t. 4; *Miq. Fl. Ind. Bat.* i. pt. 2, 186; *Mast. in Oliv. Fl. Trop. Afr.* i. 226.

EASTERN and WESTERN PENINSULAS; Southern Concan, *Nimmo;* (a doubtful native, *Gibs. and Dalz.*); CARNATIC, MALACCA and SINGAPORE, *Wallich,* &c. CEYLON.—DISTRIB. Java, Philippines, East tropical Africa.

Trunk straight; bark smooth; branches spreading. *Leaves* 6–12 by 2–3 in., 5-nerved, smooth on both surfaces; petiole nearly as long as the blade; stipules ensiform. *Flowers* rose-coloured. *Petals* 5, shorter than the lanceolate sepals. *Seeds* tubercled.

6. **HELICTERES,** Linn.

Trees or shrubs, more or less stellate-pubescent. *Leaves* simple. *Flowers* axillary, solitary or fascicled. *Calyx* tubular, 5-fid, often irregular. *Petals* 5, clawed, equal or unequal, the claws often with ear-shaped appendages. *Staminal column* adnate to the gynophore, 5-toothed or lobed at the apex; anthers in groups at the top of the column between its teeth, 2-celled, cells divergent, sometimes confluent. *Ovary* at the top of the column, 5-lobed, 5-celled; styles awl-shaped, more or less united, slightly thickened and stigmatose at the tips; ovules many in each cell. *Follicles* spirally twisted or straight. *Seeds* tubercled; albumen scanty; cotyledons leafy, folded round the radicle which is next the hilum.—Distrib. About 30 species, natives of the tropics of both hemispheres, most abundant in America.

Sect. I. **Spirocarpæa.** *Ripe carpels* spirally twisted.

1. **H. Isora,** *L.; DC. Prodr.* i. 475; *Roxb. Fl. Ind.* iii. 143; *W. & A. Prodr.* i. 60; *Wall. Cat.* 1179; *Dalz. & Gibs. Bomb. Fl.* 22; *Thwaites Enum.* 28; *Beddome Flor. Sylvat. Anal. Gen.* t. 5; *Wight Ic.* t. 180; *Miq. Fl. Ind. Bat.* i. pt. 2, 169. H. chrysocalyx, *Miq. in Pl. Hohen.* H. Roxburghii, *G. Don Gen. Syst.* i. 507.—*Rheede Hort. Mal.* vi. t. 30.

Dry forests throughout Central and Western India, from Behar, as far West as Jamu, the Western Peninsula, and Ceylon.—Distrib. Java, North Australia.

Arborescent or shrubby. *Leaves* 3 by 2½ in., bifarious, obliquely cordate, roundish obovate, often lobed, shortly acuminate, serrate, scabrous above, pubescent beneath; petiole ¼ in., as long as the linear subulate stipules. *Peduncles* 2–3 together, in a short axillary cyme. *Bracteoles* small, subulate. *Flowers* 1½ in. *Calyx* gibbous, laterally compressed, somewhat 2-lipped. *Petals* reflexed, red at first, fading to lead colour, very unequal in size, 2 lower much the largest, claw winged. *Staminodes* 5 emarginate scales. *Stamens* 10; anthers ovate. *Fruit* cylindric, beaked, pubescent.

Var. 1. *tomentosa;* under side of leaves tomentose, *W. & A. l.c.; Wall. Cat.* 1179 F.—The Western and Central forms are mostly of this variety.

Var. 2. *glabrescens;* under side of leaves nearly glabrous, *W. & A. l.c.; Wall. Cat.* 1179 C partly, E partly.—Miquel's *H. chrysocalyx* is a large-flowered form of this variety, to which most of the Southern forms belong.

Sect. II. **Orthocarpæa.** *Ripe carpels* straight, not spirally twisted.

2. **H. angustifolia,** *L.; DC. Prodr.* i. 476; leaves glabrous above cano-tomentose beneath, ripe carpels stellate-pilose sometimes mossy. *Wall. Cat.* 1180. H. lanceolata, *DC. Prodr.* i. 476. H. virgata, *Wall. Cat.* 1181. Oudemansia integerrima, *Miq. Pl. Jungh.* i. 296; *Fl. Ind. Bat.* i. pt. 2, 170. O. integerrima var. β angustifolia, *Hassk. Hort. Bog.* i. 98; *Miq. l.c.*

Mergui, *Griffith;* Malacca.—Distrib. Java, Siam, China.

Shrubby. *Leaves* 3 by ½ in.; base tapering, 3-nerved, entire or minutely serrulate; petiole ¼ in. *Cymes* racemose-fasciculate; peduncles 1 in. *Calyx* ¼ in. *Petals* linear, longer than the stamens, with two teeth at the base of the limb. *Carpels* ½ to ¾ in., oblong, obtuse, apiculate.—Varies in breadth of leaf and amount of pubescence.

3. **H. elongata,** *Wall. Cat.* 1845; leaves obliquely oblong-lanceolate serrate thinly stellate hairy above pubescent and stellate-hairy beneath, ripe carpels stellate-hairy or mossy.

Ava, at Taong Dong; Birma, *Griffith, Wallich;* Eastern Bengal, Sikkim, alt. 1000 ft., *J. D. H.*—Distrib. Yunan.

A diffuse, straggling shrub; branches very slender, stellate hairy. *Leaves* 3 by 1½ in.; petiole ¼–½ in. *Cymes* elongate, terminal, nearly as long as the leaves, many-flowered.

Bracteoles setaceous. *Calyx* bell-shaped, 5-fid; lobes deltoid-lanceolate, pubescent. *Carpels* 5, 1–1½ in., oblong, beaked.—Varies in amount of pubescence, and in shagginess of capsule. The Himalayan forms have subglabrous leaves and very shaggy carpels.

4. **H. obtusa,** *Wall. Cat.* 1184; leaves thickly stellate hairy above pubescent beneath oblong obtuse entire base rounded, cymes spicate, ripe carpels shaggy oblong obtuse. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 62.

TAVOY, *Gomez;* MERGUI, *Griffith;* MOULMEIN, *Lobb;* PEGU, *M'Lelland;* ANDAMAN ISLDS., *Kurz.*—DISTRIB. China.

Shrubby, herbaceous portions ferruginous. *Leaves* 2½–4 by 1 in., quite entire 3-nerved, petiole ½ in. *Cymes* not much exceeding the petiole; pedicels with 3 minute setaceous bracteoles beneath the flower. *Flower-buds* ovoid. *Flowers* small, ¼ in. *Calyx* cylindric campanulate. *Ripe carpels* scarcely 1 inch.

5. **H. glabriuscula,** *Wall. Cat.* 1185; leaves obliquely lanceolate base cordate thinly stellate-hairy serrulate, ripe carpels short stellate-hairy. ? H. spinulosa, *Wall. Cat.* 1847.

AVA, at Prome, *Wallich;* BIRMA, *Griffith.*

Shrubby, diffuse; branches very slender, virgate, purple, glabrescent. *Leaves* 4¼–4 by ½–1¼ in.; petiole ¼ in.; stipules subulate, deciduous, as long as the petiole. *Flowers* spicate; peduncles half the length of the leaf. *Ripe carpels* ½–¾ in., oblong, beaked, stellate-hairy.—Flowers not examined.

6. **H. spicata,** *Colebr. in Wall. Cat.* 1845, B. 1182; leaves stellate-hairy above downy beneath oblong lanceolate acuminate, base obliquely subcordate, cymes elongated spike-like, ripe carpels long shaggy. H. vestita, *Wall. Cat.* 1844. H. oblonga, *Wall. Cat.* 1183 partly. H. grewiæfolia, *Wall. Cat.* 1443. H. hirsuta ?, *Herb. Ham. in Wall Cat.* 2686.

From SIKKIM, ASSAM, and AVA, to PENANG.—DISTRIB. Malayan Archipelago to China (cult. ?).

Shrubby. *Leaves* 2–6 by 1–2 in., varying in breadth from ovate-oblong to lanceolate, unequally serrate; petiole ¼–¾ in.; stipules setaceous, as long as the petiole. *Peduncles* shorter than the leaves, 3-flowered; pedicels shorter than the flower. *Calyx* nearly ½ in., bell-shaped, curved, distended at the base, downy. *Ripe carpels* 1½–1¾ in.; stalks exserted from the persistent calyx, oblong-lanceolate, beaked, very shaggy.—Variable. The following form is sufficiently distinct to be made a separate variety.

VAR. *lanigera*, pubescent, leaves thinly hairy with simple hairs above pubescent and stellate hairy beneath coarsely and irregularly toothed, ripe carpels oblong very densely shaggy. H. lanigera, *Wall. Cat.* 1846.

The plant labelled in Wall. Cat. 2687 as *H. longifolia* and also as *H. carthagenensis* is apparently a form of this species with narrow leaves; but it is too imperfect to be accurately determined.

7. **H. plebeja,** *Kurz in Journ. Asiat. Soc. Beng.* 1870, ii. 67; shrubby, scabrous, leaves ovate-lanceolate or ovate-oblong dentate, ripe carpels stellate-tomentose and muricate.

ARRACAN, *Kurz.*

Leaves 3–5 in., mostly petioled, base rounded, slightly hispidulous or subglabrous above, stellate-hispid and scabrous beneath, densely cano-tomentose when young. *Cymes* few-flowered. *Flowers* small, yellowish. *Calyx* $\frac{1}{6}$–$\frac{1}{5}$ in., stellate-hairy. *Petals* longer than the calyx (Kurz l. c.)

7. **PTEROSPERMUM,** Schreb.

Trees or shrubs, scaly or stellate-tomentose. *Leaves* usually bifarious, leathery, oblique, simple or lobed, penninerved. *Peduncles* 1–3 axillary and terminal. *Bracteoles* entire, laciniate, persistent or caducous. *Calyx* of 5 more or less connate sepals. *Petals* 5, deciduous with the calyx. *Staminal column* short, bearing, opposite to the sepals, 3 linear 2-celled anthers between each pair of five antipetalous ligulate staminodes; cells parallel; connective apiculate. *Ovary* inserted within the top of the staminal column, 3–5-celled; style entire, stigma 5-furrowed; ovules many in each cell. *Capsule* woody or coriaceous, terete or angled, loculicidally 5-valved. *Seeds* winged above, attached in two rows to the inner angle of the cells of the capsule; albumen thin or 0; cotyledons plaited or corrugated, radicle inferior.—DISTRIB. A genus of about 15 species, confined to tropical Asia.

* *Bracteoles* linear, entire, very caducous.

1. **P. Jackianum,** *Wall. Cat.* 1164; leaves rusty-pubescent beneath oblong abruptly acuminate undulate entire base 1-nerved, flowers subsessile, capsule ovoid acute.—P. oblongum, *Wall. Cat.* 1165.

PENANG, *Jack, Wallich,* &c.

A tree. *Leaves* 3–4 by 1½–2 in., oblique, nerves stellate-hairy beneath; petiole ¼ in.; stipules caducous. *Flowers* solitary, axillary, 1¾ in. diam. *Bracteoles* minute, linear-subulate. *Flower-buds* lanceolate, 5-ribbed. *Sepals* 2 in., linear-lanceolate, rusty-tomentose externally, villous within. *Petals* half the length of the sepals. *Capsule* 1½ by 1 in., terete, shortly stalked, covered with flat scaly hairs, 5-celled.

2. **P. suberifolium,** *Lam. Ill.* t. 576, f. ii. *not of Roxb.*; leaves creamy-pubescent beneath oblong abruptly acuminate coarsely toothed or somewhat lobed towards the apex base cuneate rounded or subcordate 4-nerved, capsule ovoid or obovoid-terete, seeds 4 in each cell. *W. & A. Prodr.* i. 68.; *Thwaites Enum.* 30; *Dalz. & Gibs. Bomb. Fl.* 24; *Wight in Hook. Bot. Misc.* iii. t. 26; *Wall. Cat.* 1166; 1172 *in part.* P. canescens, *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 1162. P. oblongum, *Wall. Cat.* 1165? Pentapetes suberifolia, *L.*; *Cav. Diss.* iii. t. 43, f. 2.

WESTERN PENINSULA; Madras, Pondicherry, &c.; AVA, at Amherst, *Wallich;* CEYLON, *Thwaites.*

A small tree. *Leaves* 2–6 by 1–2 in., coriaceous, glabrous above, nerves stellate-hairy not prominent; petiole ½ in., rusty pilose. *Peduncles* axillary, twice as long as the petiole. *Bracteoles* very caducous. *Flower-buds* oblong. *Flowers* 1¼ in. diam., white, fragrant. *Sepals* oblong, revolute. *Petals* linear-oblong, obtuse, equalling the calyx. *Cells of ovary* 4-ovuled. *Capsule* 1–2 in., subangular, tapering to both ends, 4–5-valved, valves covered with dense fluffy pubescence. *Seeds* 2–4 in each cell.—The Amherst specimen (*P. oblongum*, Wall.) is imperfect, and may belong to another species, probably to *P. Jackianum*, according to a fruit preserved in the Kew Museum.

3. **P. diversifolium,** *Blume Bijdr.* 88; leaves hoary beneath obovate-oblong acuminate sinuate rarely peltate 3–5-lobed base cordate 1-nerved, capsule large subclavate-oblong 5-angled. P. acerifolium, *Zoll. & Morr. Syst. Verz.* 27, *excl. syn. Willd.*

MALACCA, *Maingay;* SOUTHERN CARNATIC, at Tinnevelly, *Beddome.*—DISTRIB. Java, Philippines.

A tree. *Leaves* 6–8 by 2½ in., coriaceous, veins arched, rusty-pilose; petiole 1 in.; stipules entire. *Peduncles* shorter than the petioles. *Flower-buds* linear-oblong. *Bracteoles* entire, strap-shaped. *Sepals* 5–6 in., linear, rusty-tomentose outside, silky within. *Ovary* downy, shorter than the style. *Capsule* 8–10 in.; woody, sulcate, tapering to the stalk.

** *Bracteoles* laciniate or palmately divided.

4. **P. rubiginosum,** *Heyne in Wall. Cat.* 1168, 1168 B; leaves rusty-pubescent beneath obliquely ovate-lanceolate entire base 4-nerved, capsule oblong beaked 5-angled 5-furrowed. *W. & A. Prodr.* i. 68; *Beddome Flor. Sylvat.* t. 106.

WESTERN PENINSULA; Canara at Tellicherry, *Rottler;* Travancor at Quilon, *Wight.*

A shrub; branches slender, rod-like. *Leaves* 2 by ¾ in., upper smaller, coriaceous, obliquely cordate, midrib with 2 nerves on one side and one on the other, basal lobe rounded, often overlapping the corresponding lobe of the adjoining leaf; petiole ¼–½ in.; stipules oblique, laciniate. *Peduncles* ½–¾ in. *Bracteoles* caducous. *Flower-buds* oblong, downy. *Flowers* 1¾ in. diam. *Sepals* 1 in., linear, rusty-tomentose. *Capsule* 2 in., ultimately glabrous.

5. **P. acerifolium,** *Willd.; DC. Prodr.* i. 500; leaves roundish or oblong simple or lobed entire or coarsely toothed palmately nerved base cordate often peltate, peduncles shorter than the petioles, capsule stipitate oblong angled sulcate glabrescent. *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 158; *W. & A. Prodr.* i. 69; *Wight Ic.* t. 63; *Wall. Cat.* 1170. P. aceroides, *Wall. Cat.* 1171; *Kurz in Journ. As. Soc. Beng.* 1873, ii. 62. Pentapetes acerifolia, *Cav. Diss.* iii. t. 44.

From the N. WEST HIMALAYA, in Kumaon, alt. 4000 ft., to Chittagong, Tenasserim and the Concan. Both Roxburgh and Wight question it being a native either of Bengal or the Western Peninsula.—DISTRIB. Java (native?).

A large tree; bark smooth, herbaceous portions floccose-pubescent. *Leaves* 10–14 by 6–12 in., polymorphous, palmately 7–12-nerved, adult glabrescent above, cano-pubescent beneath, nerves prominent beneath and stellate-hairy; petioles like the midrib, striated, lower as long or longer than the blade; stipules multifid, caducous. *Flower-buds* oblong, obtuse, 5-angled, rusty-tomentose outside. *Bracteoles* caducous. *Flowers* 5–6 in. diam., pure white, fragrant. *Sepals* linear-oblong, internally villous. *Petals* linear-oblong, somewhat cuneate, but little shorter than the calyx. *Staminodes* club-shaped. *Ovary* oblong, 5-angled, 5-celled, cells many-ovuled. *Capsule* 4–6 in. long, at first covered with a reddish fluffy crust, 5-celled, 5-valved. *Seeds* numerous in each cell, obliquely ovoid, compressed: wing large, thin; testa brown, smooth; albumen scanty, mucilaginous; cotyledons thin, folded (Roxb.).—The flowers render water gelatinous.

6. **P. semisagittatum,** *Ham. in Roxb. Fl. Ind.* iii. 160; leaves oblong-lanceolate entire base very obliquely cordate or sagittate auricled on one side, bracteoles deeply laciniate, capsule elliptic-oblong terete. *Wall. Cat.* 1167.

CHITTAGONG, *H. f. & T.*; BIRMA, *Wallich, Griffith;* TENASSERIM, at Martaban, *Wallich.* (Carnatic, probably cultivated.)

A large tree. *Bark* ash-coloured, herbaceous portions very downy. *Leaves* 5–6 by 1¾ in., glabrescent above, hoary beneath, 5–7-nerved, auricle often as long as the petiole which is 1 in.; stipules pinnatifid. *Flowers* terminal and axillary, generally solitary on short, rusty-tomentose, drooping peduncles, 5–6 in. diam., pure white. *Bracteoles* conspicuous. *Flower-buds* lanceolate. *Sepals* linear, tomentose outside, pubescent within. *Petals* obliquely obovate-cuneate, stellate-hairy externally. *Staminodes* as long as the style. *Capsule* woody, 2–3 by 1½ in., covered with dense yellow fluffy down. *Seeds* about 10 in each cell, winged much as in *P. acerifolium.*—Dr. Brandis informs me that the geographical distribution of this species needs further enquiry.

7. **P. lanceæfolium,** *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 163; leaves lanceolate and 1-nerved acuminate base rounded, capsule ovoid acute, obscurely 5-angled. *Wall. Cat.* 1172.

NORTH-WEST HIMALAYA, Kumaon, *Madden;* SILHET, *Roxburgh;* the KHASIA MTS. ascending to 4000 ft.; TENASSERIM at Tavoy, *Wallich.*

A tree. *Shoots* slender, virgate, hoary. *Leaves* 3–6 by 1½ in., glabrescent above, covered with whitish or cream-coloured tomentum beneath, nerves stellate-hairy; petiole very short. *Stipules* 2–3-fid, subulate-lanceolate, as long as the petiole. *Peduncles* axillary, half the length of the leaves, dilated at the top. *Flower-buds* oblong, striated. *Flowers* 2–3 in. diam., sweet-scented, white. *Sepals* linear, rusty-pubescent, villous within. *Petals* obliquely cuneate, longer than the sepals. *Capsule* 3 by 1½–2 in., elliptic, covered with light grey down. *Seeds* 2–4 in each cell.

8. **P. reticulatum,** *W. & A. Prodr.* i. 69; leaves pubescent beneath oblong entire or coarsely toothed towards the apex acuminate 3-nerved base cuneate, peduncles longer than the petioles, capsule oblong acute slightly angular furrowed, seeds 4 in each cell.

MALABAR; on the Naggar hills, *Wight.*

A tree. *Leaves* 4 by 1½ in., coriaceous, whitish beneath, nerves prominent, rusty stellate-hairy; petiole very short. *Peduncles* 3-flowered. *Bracteoles* 3-sect, segments linear. *Flowers* 1½ in. diam. *Sepals* linear-lanceolate. *Petals* obovate-oblong. *Staminodes* filiform. *Ovary* with about 6 ovules in each cell. *Capsule* 3 in., furfuraceous.

9. **P. Heyneanum,** *Wall. Cat.* 1169; leaves oblong acuminate coarsely toothed or lobed near the apex 4–5-nerved base cuneate subcordate rarely peltate, peduncles as long as the petiole, capsule oblong acute obscurely 5-angled scarcely furrowed, seeds 8–10 in each cell. *W. & A. Prodr.* i. 69; *Wight Ic.* t. 489. P. suberifolium, *Willd. Sp.* iii. 728; *Bot. Mag.* 1526; *Roxb. Hort. Beng.* 50; *Fl Ind.* iii. 160. P. Lawianum, *Nimmo in Grah. Cat. Bomb. Pl.* 246; *Dalz. & Gibs. Bomb. Fl.* 24. Pentaglottis suberifolia, *Wall. Cat.* 1169, *partly.* Velaga xylocarpa, *Gærtn. Fruct.* ii. 245, t. 133.

Mountainous tracts throughout the WESTERN PENINSULA.

A middle-sized tree, herbaceous portions rusty-tomentose. *Leaves* 4–6 by 2–3½ in., variable in form and size, coriaceous, rarely lobed or peltate, whitish beneath, nerves prominent rusty-pilose; petiole pubescent, ½ in. *Stipules* deciduous, ensiform. *Bracteoles* persistent, imbricate, deeply gashed. *Flowers* large, pure white, fragrant. *Sepals* 2 in., oblong, revolute, hairy outside. *Petals* obovate, spreading. *Capsule* 2 in., pointed at both ends, more or less deeply furrowed at the sides, at first densely furfuraceous, afterwards glabrescent.—The nervation of the leaves varies in different specimens, or even on the same; when the leaves are entire the secondary nerves are arched, when coarsely toothed or lobed they are strictly feather-nerved the secondary nerves running out directly into the lobes.

10. **P. glabrescens,** *W. & A. Prodr.* i. 69; leaves obovate shortly and suddenly acuminate base cuneate cordate or subpeltate 5-nerved, stipules entire, peduncles as long as the petioles, capsule large oblong 5-angled beaked cells 10–12-seeded. *Wall. Cat.* 1169, *partly.*—*Rheede Hort. Mal.* vi. t. 58.

Hills of the WESTERN PENINSULA; the CONCAN, MALABAR, and COROMANDEL.

A tree. *Leaves* 6 by 3½ in., coriaceous, glabrescent above, ashy pubescent beneath, nerves conspicuous, rusty-pilose; petiole ¼–½ in. *Stipules* ligulate, entire, half the length of the petiole. *Bracteoles* deciduous. *Flower-buds* ovoid, acute. *Flowers* 4 in. diam. *Sepals* linear-oblong, villous within. *Petals* oblong, nearly as long as the sepals. *Capsule* 5–6 in., stipitate, at first covered with floccose rusty tomentum, afterwards glabrous.—It is not quite certain that the flowers above described belong really to this species. Wight describes the stipules as palmate, but in his specimens they are entire. Probably it is not distinct from *P. diversifolium,* Bl.

11. **P. obtusifolium,** *Wight ms.*; leaves glabrescent above ashy tomentose beneath obovate oblong 1-nerved apex 2-lobed base cuneate, capsule oblong obtuse tubercled downy.

MALABAR, and the CARNATIC; Courtallum, *Wight.*

A tree. *Leaves* 3–4 by 2½–3 in., coriaceous, slightly oblique, obscurely, and remotely toothed near the apex, feather-nerved; petiole ¼ in., downy. *Peduncle* longer than the petiole, jointed in the middle. *Bracteoles* and *flowers* not seen. *Capsule* 2 by 1 in., covered with squarish truncated tubercles.—Very distinct in its curiously tubercled fruit.

8. **ERIOLÆNA,** DC.

Trees. *Leaves* simple or lobed, downy or stellate-tomentose beneath. *Peduncles* axillary, 1–many-flowered. *Bracteoles* 3–5, laciniate, or small and caducous. *Calyx*, at first spathaceous, ultimately 5-parted. *Petals* flat, with dilated tomentose claws. *Staminal* column short, bearing externally numerous linear-oblong 2-celled anthers, in many series, cells parallel. *Staminodes* 0. *Ovary* sessile, 5–10-celled; style erect, stigmas 5–10 spreading; ovules many in each cell. *Capsule* woody, loculicidal. *Seeds* winged above; albumen thin, cotyledons plaited or contortuplicate, radicle next the hilum.—A genus of 7 or 8 exclusively Asiatic species.

* *Bracteoles* deeply cut.

1. **E. Wallichii,** *DC. Mem. Mus.* x. t. 5; leaves ovate or roundish acuminate 7-nerved base cordate, peduncles 1-flowered, bracteoles pinnatisect, sepals lanceolate, style pilose. *Wall. Cat.* 1174, C. Gumsia hirta, *Ham. in Wall. Cat.* p. 157, 1174, B.

NIPAL, *Wallich.*

A shrub, herbaceous portions shaggy-tomentose. *Leaves* 4–8 by 6 in., crenate-serrate, pilose above, stellate-tomentose beneath; petiole 1–2 in. *Stipules* nearly 1 in., leafy, lanceolate, with acute lobes. *Peduncles* villous, shorter than the leaf. *Flowers* 2½ in. diam. *Sepals* lanceolate, floccose-tomentose outside, villous within. *Petals* orbicular, with a narrow hairy claw. *Column* glabrous. *Fruit* not seen.

2. **E. Stocksii,** *Hook. fil. et Thoms. ms.*; leaves roundish subacuminate 5–7-nerved base cordate, peduncles 3-flowered longer than the leaves, bracteoles bipinnatisect mossy, sepals cuspidate, style pilose.

WESTERN PENINSULA; CONCAN, *Stocks.*

A shrub, bark purplish, herbaceous portions stellate-hairy. *Leaves* 4–5 by 3 in., crenate, stellate-hairy above, pubescent beneath; petiole 2 in. *Stipules* subulate. *Flower* 1½ in. diam. *Sepals* cuspidate, glandular at the base within. *Petals* spathulate. *Ovary* 10-lobed. *Fruit* not seen.

3. **E. Hookeriana,** *W. & A. Prodr.* i. 70; leaves roundish acuminate serrate base cordate, peduncles many-flowered, bracteoles shorter than the calyx much cut pubescent, styles pubescent.—*Beddome Flor. Sylvat. Anal. Gen.* t. 5.

WESTERN PENINSULA; the Concan, Nilghiri, and Pulney Mts., *Wight;* BEHAR, alt. 1–4000 ft., *J. D. H.*

A tree, herbaceous portions stellate-downy. *Leaves* 4 in. each way, thinly stellate-hairy or glabrescent above, rusty-tomentose beneath, nerves prominent beneath; petiole 2 in. *Peduncle* longer than the petiole, stellate-hairy, at length glabrous. *Flowers* 2 in. diam. *Sepals* narrow-lanceolate. *Capsule* 1 in., ovoid, pointed, 10-valved; valves downy, tubercled or pitted, villous at the inner angle.

4. **E. Candollei,** *Wall. Pl. As. Rar.* i. 51, t. 64; *Cat.* 1175; leaves ovate acuminate base cordate lobes rounded, peduncles many-flowered, bracteoles pinnatifid pubescent, style glabrous. *Dalz. & Gibs. Bomb. Fl.* 24.

BIRMA; Mountains of Prome, *Wallich;* WESTERN PENINSULA; Ram Ghat in the Concan, *Dalzell.* BHOTAN? *Herb. Griffith.*

A tree, bark grey, herbaceous portions stellate-hairy. *Leaves* 5 by 4 in., upper smaller, palmately 5–7-nerved, stellate-hairy above, grey-pubescent beneath, crenate-dentate; petiole 1½–3 in. *Flowers* crowded, yellow, 1½ in. *Peduncles* shorter than the leaves. *Sepals* lanceolate, glandular within at the base, slightly exceeding the bracteoles. *Petals* oblong, apex notched, claw thick, villous. *Ovary* ovoid; style glabrous, stigmas 8–10, revolute. *Capsule* 2 by 1 in., woody, ovoid, acute, beaked, 10-lobed, 10-valved; valves oblong, acute, keeled or rounded at the back, villous or rarely glabrous at the inner margin. *Seeds* ∞ imbricate; embryo erect, cotyledons flat. —The Bhotan plant may, when fuller material is accessible, prove to be distinct.

** *Bracteoles* entire, or nearly so (Jackia, *Spreng.*; Schillera, *Reich.*).

5. **E. spectabilis,** *Planch. in Herb. Hook.*; leaves ovate acuminate base cordate, cymes many-flowered panicled, bracteoles a little below the flower linear entire rarely lobed, style pilose at the base. Wallichia spectabilis, *DC. Mem. Mus.* x. 104, t. 6. Microlæna spectabilis, *Wall. Cat.* 1173. Gumsia tiliacea, *Wall. Cat.* 1173 D. G. chloroxylon, *Ham. in Wall. Cat.* p. 157, 1173, E.

CENTRAL HIMALAYA; Nipal, *Wallich;* Simla, *Webb.*

A shrub or small tree, young shoots stellate-hairy. *Leaves* 3–4 by 1½ in., unequally serrate, 7–9-nerved, scabrid above, ashy-pubescent beneath; petiole 2 in. *Stipules* capillary. *Peduncles* longer than the leaves; ultimate pedicels stellate-hairy, nearly as long as the flower. *Flowers* 2 in. diam., sulphur-coloured. *Buds* oblong. *Calyx* at first spathaceous, ultimately 5-parted; sepals linear-lanceolate. *Petals* obovate-spathulate, claw thick, villous. *Ovary* ovoid, villous, ∞-celled; stigmas ∞. *Capsule* 1½ in., woody, oblong; valves obtuse, tubercled, villous at the inner angle.—Yields a fibre fit for rope-making.

6. **E. quinquelocularis,** *Wight under Ic.* t. 882; *Ic. Index* 36; leaves roundish toothed apex acute shortly acuminate base cordate, bracteoles a little distance from the flower minute caducous entire or lobed, style hairy stigma 5–10-lobed, *Bedd. Fl. Sylvat. Anal. Gen.* t. 5. Microchlæna quinquelocularis, *W. & A. Prodr.* i. 71. M. flavescens, *Garcke in Pl. Hohenack.* No. 1533.

BEHAR, alt. 1–4000 ft., *J. D. H.;* WESTERN PENINSULA, Nilghiri mts., *Gardner;* Coimbator, *Wight;* Concan, *Dalzell;* Belgaum Ghats, *Ritchie.*

A tree, herbaceous portions stellate-hairy. *Leaves* 2½–3 in. each way, palmately 7-nerved, thinly stellate-hairy or glabrescent above, whitish and softly pubescent beneath; petioles 2 in. *Cymes* at the end of the branches; peduncles longer than the leaves, stellate-hairy; pedicels shorter than the flower, jointed above the middle. *Flower-buds* ovate-oblong. *Sepals* ¾ in., lanceolate, stellate-hairy, glandular at the base within. *Petals* equalling the sepals; claw broad, pubescent. *Column* as long as the petals. *Stigmas* revolute. *Capsule* 1¼ in., oblong, pointed, 5–10-valved; valves not tubercled, usually villous at the inner angle. *Seeds* numerous.

9. PENTAPETES, Linn.

Herbs. *Leaves* hastate-lanceolate. *Flowers* axillary. *Bracteoles* 3, caducous, subulate. *Sepals* 5, lanceolate, connate at the base. *Petals* 5. *Stamens* 20, connate at the base, 15 fertile in 5 groups (of 3 each) alternating with 5 staminodes, which are nearly as long as the petals; anthers 2-celled, extrorse. *Ovary* sessile, 5-celled, cells many ovuled; style entire, twisted and thickened upwards, stigmas 5 minute. *Capsule* loculicidally 5-valved. *Seeds* 8–12, 2-seriate in each cell, not winged; cotyledons plaited, 2 partite, radicle inferior.—A single species, widely distributed in tropical Asia.

1. **P. phœnicea,** *Linn.; Roxb. Fl. Ind.* iii. 157; *W. & A. Prodr.* i. 67; *Wall. Cat.* 1157, 2, 3, 4; *Miq. Fl. Ind. Bat.* i. pt. 2, 190. Dombeya phœnicea, *Cav. Diss.* iii. t. 43, f. 1.—*Rheede, Hort. Mal.* x. t. 56.

Throughout the hotter parts of India, from the PANJAB to BIRMA and the WESTERN PENINSULA.

A branched annual, 2–5 ft., glabrous or with a few scattered stellate hairs. *Leaves* 3–5 in., 1-nerved, crenate-serrate; petiole 1 in. *Stipules* subulate. *Peduncle* simple, axillary, as long as or longer than the petiole, 1–2-flowered, jointed near the flower. *Bracteoles* half the length of the calyx. *Flowers* red, opening at noon and closing at the following dawn. *Sepals* stellate-hairy, with a few simple bristles. *Petals* obovate. *Style* short. *Capsule* subglobose, bristly, half the length of the persistent calyx.

10. **MELHANIA,** Forsk.

Undershrubs. *Leaves* simple, downy. *Peduncles* axillary, 1-flowered. *Bracteoles* 3–5, cordate, often longer than the sepals. *Flowers* yellow. *Sepals* 5, connate below. *Petals* 5 marcescent. *Stamens* 10, connate below into a very short tube, fertile filaments 5, alternating with as many ligulate staminodes; anther-cells parallel. *Ovary* sessile, 5-celled, cells 1-many-ovuled; styles 5, subulate, connate below, stigmatiferous on the inner face. *Capsule* loculicidally 5-valved. *Seeds* albuminous; cotyledons plicate, biparted, radicle inferior.—DISTRIB. Species 16 distributed over the hotter parts of Africa, Asia, and Australia.

* *Bracteoles* linear.

1. **M. incana,** *Heyne in Wall. Cat.* 1200; leaves narrow elliptic-oblong serrulate, bracteoles linear-oblong shorter than the calyx, capsule subglobose shorter than the calyx. *W. & A. Prodr.* i. 68; *Miq. Fl. Ind. Bat.* i. pt. 2, 191.

WESTERN PENINSULA; dry hills in the Carnatic and Mysore, *Heyne*, &c.

Suffruticose, branches spreading. *Leaves* 1–2 by ⅓–½ in., linear-oblong, obtuse, base subcordate, tomentose beneath; peduncle 1–2-flowered, as long as the petiole, jointed in the middle. *Flowers* small. *Sepals* ¼ in., lanceolate, acuminate. *Petals* obovate, longer than the sepals. *Capsule* hairy, shorter than the sepals. *Seeds* 2–4 in each cell, tubercled.

2. **M. abyssinica,** *A. Rich. Fl. Abyss.* i. 76, t. 18; leaves elliptic obtuse crenate-dentate pubescent above paler and tomentose beneath, bracteoles linear shorter than the calyx, capsule longer than the calyx. *Mast. in Oliv. Fl. Trop. Afr.* i. 231. Brotera ovata, *Cav. Ic.* v. 20, 433. Melhania ovata, *Boiss. Fl. Orient.* i. 841, *excl. syn.*

SINDH, *Stocks*.—DISTRIB. Cape de Verde islands, Abyssinia.

Suffruticose, cano-tomentose, branches prostrate intricate spreading. *Leaves* 1 by ¾ in., doubly-serrate; petiole ½ in. *Stipules* ¼ in., capillary. *Peduncles* axillary, as long as or longer than the petiole, 2–4-flowered. *Flowers* ¾ in. diam. *Bracteoles* nearly as long as the lanceolate sepals. *Petals* obovate, shorter than the sepals. *Style* very short. *Capsule* slightly exceeding the persistent calyx.

** *Bracteoles* broad, at least at the base.

3. **M. cannabina,** *Wight in Herb. Kew.*; leaves oblong obtuse crenulate base subcordate, bracteoles lanceolate equalling the lanceolate cuspidate sepals, capsule subgibbous shorter than the calyx.

WESTERN PENINSULA; in the Carnatic and Mysore, *Wight*, &c.

A shrub, herbaceous portions cano-pubescent. *Leaves* 2½–1½ in., sub-3-nerved, paler beneath; petioles 1¼ in. *Stipules* fugacious. *Cymes* peduncled; peduncles equalling the petioles; ultimate pedicels shorter than the flowers. *Flowers* ½ in. diam. *Bracteoles* striated. *Capsule* villous, the size of a large pea. *Seeds* numerous, angled, rugose.

4. **M. Hamiltoniana,** *Wall. Pl. Asiat. Rar.* i. t. 77; leaves roundish-ovate subcordate obtuse unequally toothed, peduncles axillary twice the length of the petiole, bracteoles cordate-ovate longer than the calyx.

WESTERN PENINSULA and BIRMA.

A shrub, cano-tomentose, branches spreading. *Leaves* 2–3 in., pubescent on both surfaces, white beneath, 5-nerved; petiole 1 in. *Stipules* setaceous, scarcely shorter than the petiole. *Peduncles* axillary and terminal, 3-flowered. *Bracteoles* recurved at the edges. *Sepals* lanceolate, cuspidate, villous. *Petals* yellow, obovate, oblique, longer than the sepals. *Staminodes* ligulate. *Capsule* ovoid, obscurely truncated at the top, villous, shorter than the calyx, 5-celled, cells many-seeded. *Seeds* oblong, somewhat 4-sided, truncated, tubercled.

VAR. 1. *tomentosa;* leaves rounded or subcordate at the base densely tomentose obtuse, petals hardly exceeding the sepals. Pentapetes tomentosa, *Wall. Cat.* 1156.—Dry places on the banks of the Irawaddi, *Wall.*

VAR. 2. *abutiloides,* Arn. (sp.); leaves deeply cordate cano-tomentose more membranous acute or acuminate, petals much exceeding the sepals. *Wight. Ic.* t. 23.—Western Peninsula.

5. **M. futteyporensis,** *Munro in Herb. Hook.;* leaves oblong acuminate serrate base cordate, bracteoles equalling the calyx cordate-oblong acute margins recurved, sepals lanceolate cuspidate. M. Hamiltoniana, *Munro, Hort. Agrens.* 9 (*not of Wall*).

NORTH WESTERN INDIA, from the Indus Valley, alt. 2500 ft., *Stewart,* to Delhi, *Falconer,* and Bundelkhund, *Edgeworth;* SINDH, *Stocks.*

A cano-pubescent shrub. *Leaves* 3 by 2 in., petiole 1 in. *Stipules* setaceous. *Peduncles* axillary and terminal, 2–4-flowered, twice the length of the petiole. *Flowers* 1 in. diam. *Capsule* ½ in., oblong, villous, scarcely so long as the sepals.

6. **M. tomentosa,** *Stocks in Herb. Hook.;* leaves oblong-lanceolate crenate-serrate, base rounded, peduncles terminal cymose, bracteoles oblong-lanceolate cuspidate shorter than the sepals. M. abutiloides, *Aitch. Cat. Punj. Pl.* 23 *partly, not of Arn.*

The PANJAB, *Aitchison;* SINDH, *Stocks.*

A cano-tomentose shrub. *Leaves* 2 by 1½ in.; thinly stellate-hairy above, paler and softly pubescent beneath; petiole ¾ in. *Peduncles* about the length of the leaves, 2-3-flowered. *Bracteoles* ½ in., margins not recurved. *Sepals* ¾ in., oblong-cuspidate, tomentose. *Capsule* oblong, villous, shorter than the calyx. *Seeds* muricate, angled.—Nearly allied to *M. futteyporensis,* but with flowers about half the size.

7. **M. Denhami,** *Br. in Denh. & Clapp. Voy. App.* 233; leaves ovate-oblong crenate-serrate 5-nerved at the base, bracteoles cordate-reniform accrescent membranous. *Mast. in Oliv. Trop. Afr.* i. 230. M. bracteosa, *Boiss. Fl. Orient.* i. 841. Brotera bracteosa, *Guill. et Perr. Fl. Seneg.* i. 80, t. 17. Cardiostegia Kotschyi, *Presl. Epimel. Bot.* 249.

Hills of SINDH, *Stocks.*—DISTRIB. Beloochistan, Tropical Africa and Arabia.

Suffruticose, cano-tomentose. *Branches* spreading. *Leaves* 1½ in., elliptic, stellate-hairy above, hoary-pubescent beneath; petiole ½–1 in. *Stipules* setaceous. *Peduncles* as long as the petiole, 3-flowered. *Sepals* ovate-lanceolate. *Petals* yellow. *Capsule* spheroid, downy, hardly as long as the calyx. *Seeds* 1 or 2 in each cell.—The flowers open in the evening.

11. MELOCHIA. Linn.

Herbs or undershrubs, more or less downy. *Leaves* simple. *Flowers* small, clustered or loosely panicled. *Sepals* 5, connate below. *Petals* 5, spathulate, marcescent. *Stamens* 5, opposite to the petals, connate below into a tube; anthers extrorse, 2-lobed, lobes parallel. *Ovary* sessile, 5-celled; cells opposite the petals, 2-ovuled; styles 5, free or connate at the base. *Capsule* loculicidally 5-valved. *Seeds* ascending, albuminous; embryo straight, cotyledons flat, radicle next the hilum.—DISTRIB. Species about 50, natives of the warmer regions of both hemispheres.

1. **M. corchorifolia,** *Linn.; Willd. Sp. Pl.* iii. 604; leaves oblong-ovate serrate plaited base rounded or cordate, flowers in terminal or axillary heads, with bracteoles intermixed, capsule globose. *Roxb. Fl. Ind.* iii. 139; *Thwaites Enum.* 30; *Wall. Cat.* 1196 *in part.* M. truncata, *Willd. Sp. Pl.* iii. 601. M. supina, *L. Sp. Pl.* 944. M. affinis, *Wall. Cat.* 1198. M. pauciflora, *Wall. Cat.* 1199. Riedleia corchorifolia, *DC. Prodr.* i. 491; *W. & A. Prodr.* i. 66; *Miq. Fl. Ind. Bat.* i. pt. 2, 188; *Dalz. & Gibs. Bomb. Fl.* 24. R. truncata *W. & A. l.c.* 66. R. supina, *DC. Prodr.* i. 491. R. concatenata, *DC. Prodr.* i. 492. Visenia corchorifolia, *Spreng. Syst.* iii. 30. V. concatenata, *Spreng. Syst.* iii. 30. V. supina, *Spreng. Syst.* iii. 31. Melochia concatenata, *Wall. Cat.* 1197. Sida cuneifolia, *Roxb. Hort. Beng.* 50.—*Rheede Hort. Mal.* ix. t. 73.

Generally distributed in the hotter parts of India from Kumaon alt. 4000 ft. to Sikkim, Malacca and Ceylon.—Distrib. A widely diffused tropical weed.

An erect branching herb or undershrub, thinly stellate-hairy. *Leaves* 1–3 in., variable in form, rarely obscurely lobed, subglabrous above, thinly stellate-hairy beneath, base 5-nerved; petiole 1 in. *Stipules* subulate-lanceolate, shorter than the petiole. *Sepals* ½ in., lanceolate, acuminate. *Petals* obovate, white or pink, longer than the sepals. *Capsule* the size of a small pea, globose, exceeding the persistent calyx.—Variable. Wallich's *M. affinis* has the branches of the cyme lengthened and spike-like with flowers on one side only as in the form called *concatenata.*

2. **M. velutina,** *Beddome Fl. Sylvat.* t. 5; leaves cordate suborbicular acuminate serrate, flowers in umbellate corymbs, capsule oblong 5-lobed, seeds winged. Visenia umbellata, *Wight Ic.* 509. V. tomentosa, *Miq. Pl. Hohen. Exsicc.* Riedleia tiliæfolia, *DC. Prodr.* i. 491; *Dalz. & Gibs. Bomb. Fl.* 24; *Miq. Fl. Ind. Bat.* i. pt. 2, 188. Glossospermum velutinum, *Wall. Cat.* 1153. G.? cordatum, *Wall. Cat.* 1155.

Widely distributed through the hotter parts of India, from the N.W. Provinces to the Concan and Ava, but often cultivated only.—Distrib. Wild or cultivated in the Mauritius and Malay islands.

A shrub or tree, herbaceous portions stellate-hairy. *Leaves* 4 by 3 in., thinly stellate-hairy or glabrescent above, downy beneath, base 5–7-nerved; petiole 3 in. *Stipules* ¼ in., leafy, roundish. *Panicles* many-flowered, lax, terminal and axillary. *Flowers* ¼ in. diam., pink. *Calyx* campanulate, lobes 5, deltoid-ovate, connate to about the middle. *Petals* oblong, twice the length of the sepals. *Stamens* inserted with the petals on a lobed hypogynous disk, filaments flat. *Ovary* 5-celled; styles 5, opposite the petals. *Capsule* ½ in., 5-lobed, bristly. *Seed* solitary in each cell, wing ascending.

M. pyramidata, *Linn.* occurs as an introduced weed in India.

12. **WALTHERIA,** Linn.

Herbs or undershrubs. *Leaves* simple. *Stipules* narrow. *Flowers* small, in dense axillary or terminal clusters. *Sepals* 5, connate below into a bell-shaped tube. *Petals* 5, oblong-spathulate. *Stamens* 5, tubular below; anthers 2-lobed, lobes parallel. *Staminodes* 0. *Ovary* sessile, 1-celled; ovules 2, ascending; style excentric, stigma club-shaped. *Capsule* 2-valved, 1-seeded. *Seed* ascending, albuminous; embryo straight, cotyledons flat, radicle next the hilum.—Distrib. About 15 species, one or two of which are tropical weeds, the remainder are natives of tropical America.

1. **W. indica,** *L.; DC. Prodr.* i. 493. *W. & A. Prodr.* i. 67; *Thwaites Enum.* 30; *Miq. Fl. Ind. Bat.* i. pt. 2, 187; *Dalz. & Gibs. Bomb. Fl.* 23; *Wall. Cat.* 1194. W. americana, *L.; DC. Prodr.* i. 492; W. elliptica, *Cav. Diss.* vi. 171; *Wall. Cat.* 1195. Melochia corchorifolia, *Wall. Cat.* 1196, H, *not of others.*

Common in all the hotter parts of INDIA, from KUMAON alt. 4000 ft. to MALACCA and CEYLON.—DISTRIB. A widely diffused Tropical weed.

Perennial, villous. *Leaves* 1–3 in., shortly petioled, cordate-ovate, oblong, obtuse, toothed, plaited. *Flowers* yellow, ¼ in. *Bracts* narrow, villous. *Sepals* lanceolate, acuminate. *Petals* longer than the sepals, stalked.

13. **ABROMA,** Jacq.

Trees or shrubs. *Leaves* cordate, ovate-oblong, serrulate, sometimes angled. *Peduncles* opposite the leaves, few-flowered. *Sepals* 5, connate near the base. *Petals* 5, purplish, concave below, prolonged above into a large spoon-shaped lamina. *Staminal-cup* of 5 fertile and as many sterile divisions, fertile filaments opposite the petals, 3-antheriferous; anthers 2-lobed, lobes divergent. *Staminodes* longer than the fertile filaments, obtuse. *Ovary* sessile, pyramidal, 5-lobed; cells many-ovuled; styles 5. *Capsule* membranous, 5-angled, 5-winged, truncate at the apex, septicidally 5-valved, valves villous at the edges. *Seeds* numerous, albuminous; embryo straight, cotyledons flat cordate, radicle next the hilum.—DISTRIB. 2 or 3 species, natives of Tropical Asia.

1. **A. augusta,** *Linn.; DC. Prodr.* i. 485; *Roxb. Hort. Beng.* 50; *Fl. Ind.* iii. 156; *Miq. Fl. Ind. Bat.* i. pt. 2, 183; *Beddome Flor. Sylvat. Anal. Gen.* t. 5; *W. & A. Prodr.* i. 65; *Wall. Cat.* 1142. A. angulata, *Lam. Ill,* 636. A. Wheeleri, *Retz. Obs.* v. 27; *Willd. Sp. Pl.* iii. 1425. A. fastuosum *Gærtn. Fruct.* i. 307, t. 64.

Widely spread, native or cultivated, throughout the hotter parts of India from the NORTH WEST PROVINCES to SIKKIM, alt. 3000 ft.; KHASIA MTS. alt. 4000 ft., and Assam.—DISTRIB. Java, Philippines, China.

A shrub, branches downy. *Leaves* 4–6 by 4–5 in. repand-denticulate, base 3–7-nerved, upper smaller, narrower, entire, glabrescent above, tomentose below; petiole ½–1 in. *Stipules* linear, deciduous as long as the petiole. *Peduncle* 1½ in., axiliary. *Flowers* 2 in. diam. *Sepals* 1 in., lanceolate, free nearly to the base. *Petals* scarcely exceeding the sepals, imbricate in the bud, deciduous. *Capsule* 1½ in., obpyramidal ultimately glabrous, thrice as long as the persistent calyx.—The bark yields good fibre.

14. **GUAZUMA,** Plum.

A tree. *Leaves* simple, tomentose. *Flowers* in axillary cymes. *Sepals* 5, connate below the middle, at first spathaceous. *Petals* 5, concave at the base, prolonged at the apex into 2 narrow strap-shaped processes. *Stamens* 10, connate into a column which is tubular below, and consists above of 5 fertile, 3-antheriferous filaments opposite the petals, and 5 lanceolate staminodes opposite the sepals; anthers 2-lobed, lobes divergent. *Ovary* sessile, 5-lobed, 5-celled; styles more or less connate; ovules numerous in each cell. *Capsule* oblong, woody, tubercled, resembling a mulberry. *Seed* albuminous; embryo curved, cotyledons leafy folded, radicle next the hilum.—DISTRIB. A genus of 5 species, chiefly natives of Tropical America.

1. **G. tomentosa,** *Kunth; DC. Prodr.* i. 485; *Wight Ill.* t. 31; *W. & A. Prodr.* i. 64; *Thwaites Enum.* 29; *Beddome Fl. Sylvat.* t. 107. Buboma tomentosa, *Spreng. Syst.* iii. 385. G. ulmifolia, *Wall. Cat.* 1141 Diuroglossum rufescens, *Turcz. in Flora* 1853, 735.

Generally distributed and frequently cultivated in the warmer parts of India an CEYLON, but perhaps only introduced.—DISTRIB. Java, Tropical America.

A tree, herbaceous portions stellate-tomentose. *Leaves* 3–4½ by 2 in., oblong-lanceolate, obliquely cordate, acuminate, serrate, scabrid, or glabrescent above, pubescent beneath, base 5–7-nerved; petiole short. *Flowers* numerous, yellow, in terminal and axillary panicles, which are twice the length of the leaves. *Flower-buds* globose. *Calyx* $1\frac{1}{2}$ in., bell-shaped, stellate-hairy. *Sepals* ultimately reflexed. *Petals* exceeding the calyx. *Anthers* concealed in the hood of the petals. *Capsule* 1 in., oblong, obtuse, covered with obtuse black tubercles.

15. **BUETTNERIA,** Linn.

Herbs, trees or shrubs, often climbers, frequently prickly. *Foliage* various. *Flowers* minute, in repeatedly branched axillary or terminal umbellate cymes. *Sepals* 5, connate at the base. *Petals* 5, claw concave, limb with a long strap-shaped 2-fid appendage. *Stamens* 10, connate below into a membranous tube, bearing above 5 fertile stamens opposite the petals, and 5 staminodes opposite the sepals; anthers 2-lobed, extrorse. *Ovary* sessile, 5-celled; cells opposite the petals, 2-ovuled; style entire or 5-fid. *Capsule* globose, spiny, septicidally 5-valved, valves breaking away from a central column, cells 1-seeded. *Seed* ascending, exalbuminous; cotyledons folded around the superior radicle, plumule lobed.—DISTRIB. About 45 species, mostly natives of tropical America, a few are Asiatic, and one African.

* *Leaves* usually longer than broad, generally simple.

1. **B. herbacea,** *Roxb. Cor. Pl.* i. t. 29; *Fl. Ind.* i. 619; herbaceous, unarmed, leaves glabrous ovate acuminate toothed paler beneath, capsule covered with small subulate prickles. *Wall. Cat.* 1146; *W. & A. Prodr.* i. 65; *Wight Ic.* t. 488; *Dalz. & Gibs. Fl. Bomb.* 23. Commersonia herbacea, *G. Don. Gen. Syst.* i. 523.

WESTERN PENINSULA; not uncommon in the Carnatic, Orissa, and Concan.

Stem herbaceous, unarmed. *Leaves* $1\frac{1}{4}$–$2\frac{1}{2}$ by $\frac{3}{4}$ in., base cordate or rounded, 3–5-nerved, nerves not glandular; petiole $\frac{1}{8}$ in. *Stipules* linear, equalling the petiole. *Inflorescence* longer than the adjoining leaf. *Sepals* linear-lanceolate, reflexed. *Limb of petals* subulate, as long as the sepals, puberulous. *Fertile filaments* very short; staminodes ovate. *Fruit* the size of a pea, 5-lobed.

2. **B. crenulata,** *Wall. Cat.* 1150; a tree, branches unarmed, leaves glabrous elliptic acuminate, capsule globose glabrous covered with long linear-lanceolate spines. B. polyacantha, *Wall. Cat.* 1151? B. catalpifolia, *Wall. Cat.* 1152? B. echinata, *Wall. Cat.* 1149?

NIPAL, *Wallich;* BIRMA, at Attran and Saluen, *Wallich;* PEGU, *M'Clelland.*

Leaves 4–5 by 2–3 in., coriaceous, leaves 5–7-nerved, rounded; petiole 2 in., thickened at both ends. *Peduncles* short, thinly stellate-hairy, pedicels $\frac{1}{2}$–$\frac{3}{4}$ in., jointed in the middle. *Bracteoles* equalling the pedicels, persistent, lanceolate. *Flower-buds* deltoid, 5-angular, pilose. *Flowers* $\frac{1}{4}$ in. diam. *Petals* stalked, limb cordate with two rounded lobes, apex linear. *Ovary* ovoid, style short. *Capsule* $\frac{1}{2}$ in. diam.—The above synonyms must be received with hesitation, the materials being too imperfect to allow of satisfactory determination.

3. **B. Jackiana,** *Wall. in Roxb. Fl. Ind.* (*ed. Carey*) ii. 386; shrubby, unarmed, leaves elliptic acuminate scabrid above, stellate hairy beneath, nerves pilose, capsule globose covered with straight-subulate spines. *Wall. Cat.* 1147.

PENANG, *Jack,* &c.

A climbing shrub; herbaceous portions pilose and downy. *Leaves* 3–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., entire or minutely serrated, base rounded; petiole $\frac{3}{4}$ in. pilose. *Panicles* axillary, much shorter than the leaves, many-flowered; pedicels capillary, stellate-hairy. *Sepals* $\frac{1}{8}$ in., deltoid acuminate, spreading. *Petals* shorter than the sepals. *Capsule* 1 in. diam., glabrous, 5-lobed. *Seeds* black.

4. **B. elliptica,** *Mast.;* shrubby, unarmed, leaves pilose on both surfaces especially along the nerves elliptic-oblong shortly acuminate.

Malacca, *Maingay.*

A climbing shrub. *Stem* terete, downy. *Leaves* 5–6 by 3 in., base 5-nerved, rounded; petiole 3 in., pilose. *Peduncles* axillary, shorter than the petiole; pedicels ¼–½ in., umbellate, thinly stellate-hairy. *Flowers* ⅛ in. diam. *Petals* shorter than the lanceolate sepals. *Fruit* not seen.

5. **B. uncinata,** *Mast.;* shrubby, unarmed, leaves glabrescent elliptic-lanceolate acuminate, capsule covered with hooked gland-tipped barbed spines.

Malacca, *Maingay.*

Stem glabrous, scarred. *Leaves* 8–10 by 3 in., coriaceous, glabrous or with a few thin hairs along the midrib on the under surface, base rounded, 3-nerved; petioles 2½–3 in., thickened at both ends. *Fruiting-peduncles* half the length of the leaves. *Capsule* depressed, 3-celled, spheroidal, the size of a hazel nut.

6. **B. Maingayi,** *Mast.*; shrubby, unarmed, leaves glabrous on both surfaces lanceolate acuminate, capsule globose obscurely 5-lobed studded with short subulate prickles.

Malacca, *Griffith, Maingay.*

A climbing shrub. *Leaves* 10 by 3 in., coriaceous, base rounded, 5-nerved; petiole 2 in., thickened at both ends. *Peduncles* barely 1 in., spreading at right angles, and bearing an umbel of flowers; pedicels ¼ in. *Sepals* ¼ in., ovate-lanceolate. *Petals* shorter than the sepals, with a long linear appendage. *Staminodes* erect, oblong, obtuse, 2-fid. *Style* as long as the ovary. *Fruiting peduncle* as long as the petiole. *Capsule* 1¼ in. diam.

** *Leaves* more or less orbicular, or not much longer than broad, usually lobed.

7. **B. aspera,** *Colebrooke in Roxb. Fl. Ind.* (*ed. Carey*) ii. 383 *and in Wall. Cat.* 1144; a tree, unarmed, leaves glabrescent suborbicular or oblong shortly acuminate base cordate, capsule glabrous globose covered with stout curved prickles. B. grandifolia, *DC. Prodr.* i. 486. B. nepalensis, *Turcz. in Bull. Mosc.* 1858, 207.

Nipal, *Wallich;* Sillet, *Da Silva,* Sikkim and the Khasia Mts., ascending to 4000 ft., *J. D. H. & T. T.*—Distrib. China.

Tree. *Leaves* 4 by 2½ in. and upwards, base 7-nerved; petiole 2 in. and upwards. *Peduncle* pubescent, as long as the petioles; pedicels umbellate, ultimate pedicels ½ in., jointed in the middle. *Flower-buds* ovoid. *Flowers* minute, downy, campanulate. *Sepals* deltoid. *Capsule* 1½ in.

8. **B. andamanensis,** *Kurz in Journ. As. Soc.* 1871, ii. 47; *Flora,* 1871, 277; shrubby, unarmed, leaves glabrescent palmately lobed, capsule globose glabrous covered with short subulate spines.

Andaman Islds., *Kurz;* Tenasserim, at Martaban, *Brandis;* and Moulmein, *Lobb.*

A climbing shrub. *Stem* terete. *Leaves* 4–5 by 4 in., thinly stellate-hairy, glabrescent, ovate, shortly 3–5-lobed, lobes acute or acuminate, irregularly and coarsely toothed, base 5–7-nerved, deeply cordate, lobes rounded; petiole 2–4 in. *Stipules* ½ in., subulate, deciduous. *Cymes* 2–3-chotomous. *Peduncles* slender. *Capsule* the size of a cherry.

9. **B. pilosa,** *Roxb. Fl. Ind.* i. 618; shrubby, unarmed, leaves pilose on both surfaces suborbicular palmately lobed, capsule globose downy, studded with subulate barbed prickles. *Wall. Cat.* 1145. B. velutina, *Wall. Cat.* 1148, 1925.

EASTERN BENGAL; SILHET, *Da Silva;* Assam and Khasia Mts., *Griffith;* BIRMA, *Wallich,* &c.; CHITTAGONG, *H. f. & T.*

A climbing shrub. *Branches* hispid with spreading hairs, or thinly stellate-hairy. *Leaves* 4 in., shortly 3-lobed, lobes deltoid, entire or serrulate, 7–9-nerved, midrib glandular, base deeply cordate, lobes rounded, upper ovate-lanceolate; petiole 1½–4 in., densely rusty-tomentose. *Stipules* subulate. *Inflorescence* lax, much branched; peduncles longer than the petioles. *Flowers* minute, campanulate. *Sepals* lanceolate. *Petals* yellow, incurved, appendage orange. *Capsule* the size of a large cherry, globose. *Seed* ovate-oblong.

16. COMMERSONIA, Forsk.

Trees or shrubs. *Leaves* simple, oblique. *Inflorescence* cymose, terminal or axillary or leaf opposed. *Calyx* 5-cleft. *Petals* 5, concave at the base, prolonged into a long strap-shaped appendage at the apex. *Fertile stamens* 5, opposite the petals; anthers subglobose, 2-celled, cells diverging; staminodes 5, opposite to the sepals, lanceolate. *Carpels* 5, opposite to the sepals, connate; *styles* connate; ovules 2–6. *Capsule* loculicidally 5-valved, covered with bristly hairs. *Seeds* ascending, albuminous, strophiolate; cotyledons flat, radicle next the hilum.—DISTRIB. A genus of about 8 species, some of which are natives of the Malay peninsula and archipelago, others of Australia.

1. **C. platyphylla,** *Andr. Bot. Rep.* t. 603, *adnot;* leaves broadly ovate-lanceolate oblique stellate-hairy above hoary tomentose beneath. C. javensis, *G. Don Gen. Syst.* i. 523. C. echinata, *Blume Bijdr.* 86; *Wall. Cat.* 1143; *Andr. Bot. Rep.* t. 519, *not of Forst.* C. echinata, *var.* β. *Miq. Fl. Ind. Bat.* i. pt. 2, 182. Buettneria hypoleuca, *Turcz. in Mosc. Bull.* 1858, 207.

MALACCA, PENANG, and SINGAPORE.—DISTRIB. Malay isles.

A shrub or low tree. Younger *branches* softly downy. *Leaves* 6 by 4 in., obliquely subcordate, subacuminate, irregularly serrulate, nerves with reddish down beneath; petioles ½–¾ in., downy. *Stipules* deciduous, herbaceous, palmately cut. *Flowers* numerous, rotate, ½ in. diam., in much branched terminal cymose corymbs; ultimate pedicels divaricate, hispid, as long as the flowers. *Calyx-lobes* ovate, as long as the tube. *Petals* 5, base concave, appendage linear. *Stamens* 5, opposite the petals, and concealed within their concavity; staminodes 5, lanceolate, opposite the sepals, as long as the petals. *Ovary* 5-celled, cells opposite the petals. *Capsule* globose, the size of a marble, covered with long filiform intricate ciliolated processes.

Var. *Leschenaultii;* leaves glabrescent equally serrate, peduncles opposite the leaves.

The true *C. echinata* of Forst. has not yet been met with within the limits of this Flora, though it probably will be discovered in Malacca. It is distinguished from the preceding by its narrower lance-shaped leaves, glabrous on the upper surface.

17. LEPTONYCHIA, Turcz.

Shrubs or trees. *Leaves* simple, entire. *Flowers* cymose axillary. *Sepals* 5, valvate, distinct nearly to the base. *Petals* 5, valvate, short, orbicular, concave. *Andrœcium* tubular below, filamentous above, filaments 3-seriate, outer series of 10–15 ligulate staminodes opposite the petals, middle of 10 fertile stamens also opposite the petals, innermost of 5 very short fleshy subulate staminodes opposite the sepals; anthers linear-oblong, introrse, dehiscing at the sides longitudinally. *Ovary* sessile, 3–4-celled; placentas axile; styles connate, stigmas capitellate; ovules many in each cell, anatropous. *Capsule* 2–3-celled, or by abortion 1-celled, dehiscing septicidally or loculicidally, or both, simultaneously or irregularly. *Seeds* black, aril fleshy orange-coloured, albumen fleshy; cotyledons flat leafy, radicle superior.—DISTRIB. A genus of 3 or 4 species, natives of both Peninsulas, the Archipelago, and also of west tropical Africa.

1. **L. acuminata,** *Mast.;* leaves oblong abruptly acuminate base tapering, outer staminodes 10, inner subulate not ciliate, capsule 2-valved valves ultimately dimidiate.

MALACCA, *Maingay.*

A tree. *Leaves* 8 by 2½ in., glabrous on both surfaces; petiole ¼–2 in. *Flower-buds* oblong, pointed, 5-sided. *Flowers* ½–¾ in. diam. *Sepals* spreading, coriaceous, lanceolate, downy on both sides. *Petals* less than half the length of the sepals, erect, subcoriaceous, orbicular, concave, villous. *Andrœcium* tubular at the base, outer staminodes linear-ligulate, nearly as long as the sepals, fertile stamens intermediate, as long as the outer staminodes, and placed with them in pairs opposite the petals; anthers adnate; inner staminodes 5, very short, subulate fleshy, opposite the sepals. *Ovary* oblong, villous, 3-celled; style terete, as long as the fertile filaments, stigma capitate obscurely lobed. *Seed* oblong, testa black shining smooth, aril fleshy orange-yellow tubular covering half the seed from the hilum upwards, albumen fleshy, embryo straight, cotyledons flat leafy base cordate, radicle superior away from the hilum.

2. **L. glabra,** *Turcz. in Bull. Mosc.* 1858, 222; leaves oblong-lanceolate abruptly acuminate base tapering subcordate, outer staminodes 15, inner staminodes ciliated, capsule 1-celled. *Oudem. in Compt. Rend. Ac. Roy. Sc. Amsterd.* 2 *ser.* ii. 8, *cum. ic.* and *Walp. Ann.* vii. 449. Grewia? caudata, *Wall. Cat.* 1099. G. heteroclita, *Roxb. Fl. Ind.* ii. 590. Binnendykia trichostylis, *Kurz in Nat. Tijdschrift Ned. Ind.* ser. 3, iii. 164. Turraea trichostylis, *Miq. Fl. Ind. Bat. Supp.* i. 502.

MALACCA, *Maingay;* PENANG, *Wallich;* MOULMEIN, *Lobb;* TENASSERIM, *Helfer.*—DISTRIB. Moluccas, Borneo, Java, Sumatra.

A tree. *Leaves* 4–6 by 2 in., glabrous or thinly stellate-hairy, base 3–5-nerved, somewhat oblique; petiole ½ in. *Peduncles* axillary, solitary, or in short few-flowering cymes. *Buds* oblong, club-shaped. *Ovary* oblong, obscurely 4-lobed. *Capsule* ½ in. depressed pyriform, coriaceous, rugose, shining and wrinkled within. *Seed* ⅓ in.—In the absence of perfect flowers on the Indian specimens it is not absolutely certain that they are specifically identical with those from Sumatra.

3. **L. moacurroides,** *Beddome Fl. Sylvat.* t. 114; leaves elliptic acuminate base rounded, outer staminodes 10, capsule tubercled.

CARNATIC and MYSORE, *Beddome;* Courtallum, *Wight.*

A small Grewioid tree. *Branches* virgate. *Leaves* 3–4 by 1¾ in., glabrous on both surfaces, base 3-nerved; petiole ¼–½ in. *Stipules* lanceolate, caducous. *Flowers* in axillary cymes, half the length of the petioles. *Sepals* ⅛ in., linear-lanceolate, pubescent. *Petals* orbicular, half the length of the sepals, densely villous. *Ovary* 4-lobed; style pubescent. *Capsule* ½–¾ in., obovoid, verrucose, irregularly 2-valved.—The leaves and flowers of this species are smaller than those of the preceding.

ORDER XXVIII. TILIACEÆ. (By Maxwell T. Masters, F.R.S.)

Trees, shrubs or herbs. *Leaves* alternate, rarely opposite, simple or lobed. *Stipules* free, often caducous. *Flowers* usually cymose, cymes few-flowered, or large and many-flowered. *Flowers* regular, hermaphrodite or unisexual. *Sepals* 3–5, free or connate, valvate. *Petals* as many as the sepals, rarely absent, imbricate or valvate. *Stamens* numerous, rarely definite, usually springing from a prolonged or dilated torus, free or sometimes 5-adelphous, filaments filiform; anthers 2-celled. *Ovary* free, 2–10-celled; styles columnar, or divided into as many divisions as there are cells to the ovary, stigmas usually distinct rarely confluent or sessile. *Ovules* attached to the inner angle of the cells of the ovary, if few in number often pendulous from the apex or ascending from the base, if more numerous disposed in 2 or more ranks, anatropous; raphe ventral or lateral. *Fruit* fleshy or dry, dehiscent or indehiscent, 2–10 or by abortion 1-celled (cells sometimes divided by false partitions), carpels separable or always united. *Seeds* 1 or many, ascending, pendulous or transverse, with no arillus, testa leathery or crustaceous or pilose, albumen fleshy abundant or scanty rarely wanting; embryo straight or slightly curved, cotyledons leafy rarely fleshy, radicle next the hilum.—DISTRIB. About 350 species some of which occur in all the great divisions of the world except the arctic and antarctic, but most abundantly in the tropics of either hemisphere. Some of the genera and many of the species are strictly Indian.

SERIES A. **Holopetalæ.** *Petals* glabrous or rarely downy, coloured, thin, unguiculate, entire or nearly so, imbricate or twisted in the bud. *Anthers* globose or oblong, opening by slits.

TRIBE I. **Brownlowieæ.** *Sepals* combined below into a cup. *Anthers* globose, cells ultimately confluent at the top.

* *Staminodes* 5.

Carpels distinct, 2-valved	1. BROWNLOWIA.
Carpels combined, indehiscent, winged	2. PENTACE.
Capsule 5-valved	3. PITYRANTHE.

** *Staminodes* 0.

Stamens on a raised torus	4. CHARTACALYX.
Stamens on a contracted torus	5. BERRYA.

TRIBE II. **Grewieæ.** *Sepals* distinct. *Petals* glandular at the base. *Stamens* springing from the apex of a raised torus.

* *Fruit destitute of prickles.*

Fruit drupaceous	6. GREWIA.
Fruit of 3–5 winged cocci	7. COLUMBIA.

** *Fruit prickly.*

Fruit large, 3-angular, indehiscent	8. ERINOCARPUS.
Fruit small, globose, indehiscent, or 3–5-coccous	9. TRIUMFETTA.

TRIBE III. **Tilieæ.** *Sepals* distinct. *Petals* not glandular. *Stamens* springing from a contracted torus.

Leaves alternate	10. CORCHORUS.
Leaves opposite	11. PLAGIOPTERON.

SERIES B. **Heteropetalæ.** *Petals* sepaloid, incised or 0, induplicate or imbricate, not twisted. *Anthers* linear, opening by a terminal pore.

Stamens on a depressed torus. Fruit capsular	12. ECHINOCARPUS.
Stamens on a raised torus. Fruit drupaceous	13. ELÆOCARPUS.

1. **BROWNLOWIA,** Roxb.

Trees. *Pubescence* stellate or scaly. *Leaves* entire, 3–5-nerved, feather-veined. *Flowers* numerous, small, in large terminal or axillary panicles. *Calyx* bell-shaped, irregularly 3–5-fid. *Petals* 5, without glands. *Stamens* many free, springing from a raised torus. *Staminodes* 5, within the stamens, opposite the petals and petaloid. *Anthers* subglobose. *Ovary* 5-celled, each cell 2-ovulate; styles awl-shaped, slightly coherent; ovules ascending. *Carpels* ultimately nearly free, 2-valved, 1-seeded. *Albumen* 0; cotyledons thick, fleshy.—DISTRIB. Three species confined to Tropical Asia.

1. **B. elata,** *Roxb. Cor. Pl.* iii. 61, t. 265; leaves ovate acute base cordate 5–7-nerved undulate downy beneath, petiole long. *Bot. Reg.* t. 1472; *Wall. Cat.* 1178. Humea elata, *Roxb. Fl. Ind.* ii. 640.

CHITTAGONG to TENASSERIM, *Roxburgh, Griffith* &c.—DISTRIB. Borneo.

A lofty tree. *Branches* spreading. *Leaves* 4–12 by 3–8 in., glabrous, white beneath, sometimes peltate; petiole 3–4 in. or longer, thickened at the apex. *Panicles* terminal, as large as the adjacent leaf, branches pubescent, ultimate pedicels longer than the flower. *Flower-buds* clavate-oblong. *Flower* ½ in., yellow. *Calyx* funnel-shaped, lobes ovate shorter than the tube. *Petals* oblong, spreading, tapering at the base, longer than the sepals. *Filaments* slender; anther-lobes divergent at the base, confluent at the apex; staminodes linear-lanceolate. *Style* as long as the petals. *Follicle* 1½ in., by abortion solitary, obliquely ovate, woody, covered with fine ash-coloured pubescence. *Seed* solitary, rarely 2, albumen 0; embryo erect, cotyledons 2 nearly equal amygdaloid.

2. **B. lanceolata,** *Benth. in Journ. Linn. Soc.* v. *Suppl.* ii. 57; leaves lanceolate-acuminate white and scaly beneath, petiole short, panicle much shorter than the leaves.

SUNDERBUNDS, *Griffith*; TENASSERIM, at Moulmein, *Parish.*

A tree. *Leaves* 4–6 by 1–2 in., glabrous; petiole ½ in., thickened at the apex. *Panicles* terminal and axillary, shorter than the leaves, peduncles longer than the petioles. *Flower-buds* ovoid. *Calyx* ⅓ in. diam., campanulate, lobes lanceolate equalling the tube. *Petals* ⅓ in., oblong base broad. *Anthers* small, didymous, lobes not widely divergent, connective thick; staminodes petaloid. *Ovary* 4-lobed, cells 2-ovuled, style simple, stigma 4-lobed. *Young fruit* pyriform, truncate.

2. **PENTACE,** Hassk.

Trees. Herbaceous portions pubescent or scaly, ultimately glabrous. *Leaves* entire, leathery, 3–5-nerved. *Flowers* numerous, small, in terminal panicles. *Calyx* bell-shaped, irregularly 3–5-fid. *Petals* 5, glandless. *Stamens* numerous, on a slightly raised torus, sometimes pentadelphous. *Staminodes* 5, opposite the sepals. *Anthers* subglobose, pollen globose 3-pored. *Ovary* 5-celled, cells 2-ovuled; ovule pendulous, raphe next the placenta. *Fruit* dry indehiscent 3–5-winged, by abortion 1-celled, 1-seeded. *Seed* solitary, albuminous.—DISTRIB. Three species, all Malayan.

1. **P. burmannica,** *Kurz in Flora,* 1871, 278; leaves elliptic ovate acute 3–5-nerved pubescent beneath, pedicels long, ovary globose 5-lobed, fruit oblong truncate 5-winged wings longer than broad.

MARTABAN, *Brandis*; PEGU, *Kurz.*

A tree. *Shoots* pubescent. *Leaves* 4 by 2½ in., oblong, rounded at the base, acuminate, glabrous, whitish beneath; petiole ½ in. *Pedicels* long, covered with tawny down.

Calyx $\frac{1}{6}$ in., pubescent, sepals lanceolate. *Petals* obovate-oblong, tapering at the base, slightly exceeding the sepals. *Capsule* $1\frac{3}{4}$ by $1\frac{1}{4}$ in., oblong-truncate, wings stellate-hairy.

2. **P. triptera,** *Mast.;* leaves 1-nerved, ovary 3-celled, fruit 3-winged wings obtuse rounded as broad as long.

MALACCA, *Griffith, Maingay.*

A tree. *Leaves* 6 by 3 in., glabrous, white beneath, oblong-acute, rounded at the base, 1-nerved, feather-veined; petiole 1 in. *Panicle* terminal. *Sepals* $\frac{1}{6}$–$\frac{1}{4}$ in., oval-lanceolate, downy. *Petals* twice the length of the sepals, oblong-spathulate. *Stamens* in 5 parcels, one opposite each petal. *Staminodes* 5, linear-subulate, much shorter than the stamens, opposite the sepals. *Ovary* pubescent, globose. *Styles* shorter than the stamens. *Capsule* $\frac{2}{3}$ by 1 in.

3. **PITYRANTHE,** Thwaites.

A tree. *Leaves* obovate. *Panicles* terminal. *Flowers* small, numerous. *Calyx* urceolate-campanulate, 3–4-lobed. *Petals* obovate, tapering at the base, glandless. *Fertile stamens* 15 in groups of 3 before the petals, filaments dilated. *Staminodes* 5, opposite the sepals. *Anther-lobes* divergent at the base. *Ovary* sessile, 5-celled, cells opposite the sepals, 1–2-ovuled, ovules pendulous; styles conjoined, stigma minute 5-lobed. *Fruit* pyriform, loculicidally 5-valved, 1-seeded by abortion. *Seeds* oblong, netted, pubescent.—DISTRIB. A single species, native of Ceylon.

1. **P. verrucosa,** *Thwaites Enum.* 29; *Beddome Flor. Sylvat.* t. 109.

CEYLON; Balticaloa, Jaffna, Trincomalee, *Thwaites.*

Leaves 2–6 by 1–3 in., shining on the upper surface, paler beneath, with stellate pubescence, crenate, base rounded 3-nerved; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Flowers* $\frac{1}{3}$ in. *Flower-buds* ovoid, acute. *Calyx* $\frac{1}{6}$ in., lobes ovate acute as long as the tube. *Petals* and stamens twice the length of the sepals. *Capsule* $\frac{3}{4}$–1 in.

4. **CHARTACALYX,** Maingay herb.

A tree. *Leaves* alternate, simple, 1-nerved. *Panicle* terminal, few-flowered. *Calyx* campanulate, 5-lobed, lobes valvate accrescent coloured. *Petals* 0. *Stamens* numerous, free, springing from the top of a short gynophore; anthers oblong, 2-celled, cells parallel dehiscing at the sides longitudinally. *Staminodes* 0. *Ovary* stalked, 5-celled; placentas axile; styles consolidated stigmas 5 linear recurved; ovules 2 in each cell, collateral, pendulous from near the apex of the placenta. *Fruit* not seen.—The following is the only known species.

1. **C. accrescens,** *Mast.;* leaves oblong acuminate entire base oblique.

MALACCA, *Maingay.*—DISTRIB. Borneo.

Branches rigid, obliquely ascending. *Leaves* 2–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., coriaceous, glabrous above, rusty tomentose beneath, base rounded or tapering, 1-nerved, venation arched; petiole $\frac{1}{3}$–$\frac{1}{2}$ in. *Panicle* stellate-hairy, pedicel 1 in., jointed near the base. *Calyx* $\frac{3}{4}$ in., ultimately 2 in. diam., papery, pink, veins prominent. *Filaments* slender, stellate-hairy, half the length of the calyx. *Ovary* pilose, ovoid, obscurely 5-lobed. *Styles* cylindric, stellate-pilose, longer than the filaments, dividing at irregular heights into 2–5 stigmatic branches.—The cohesion between the styles is apparently but slight, hence they separate one from another at varying heights.

5. BERRYA, Roxb.

A tree. *Leaves* alternate, ovate, acuminate, glabrous, base cordate, 5–7-nerved. *Panicles* large, many-flowered, terminal and axillary. *Calyx* campanulate, irregularly 3–5-lobed. *Petals* 5, spathulate. *Stamens* many, inserted on a short torus; anthers didymous, lobes divergent opening lengthwise. *Staminodes* 0. *Ovary* 3–4-lobed, cells, 4-ovuled; style consolidated, stigma lobed; ovules horizontal. *Fruit* loculicidally 3–4-valved, each valve 2-winged. *Seeds* pilose albumen fleshy; cotyledons flat leafy, radicle superior next the hilum.—Distrib. The following is the only species.

1. **B. Ammonilla,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 639; *Cor. Pl.* iii. 264; leaves ovate base cordate palmately 5–7-nerved. *Wall. Cat.* 1068; *W. & A. Prodr.* i. 81; *Wight Ill.* t. 34; *Thwaites Enum.* 32; *Beddome Flor. Sylvat.* t. 58.

Malabar, Travancore, Pegu, Martaban, *Wallich* &c.; Ceylon.

A large tree. *Leaves* 4–8 by 2½–3 in.; petiole 1½ in. and upwards. *Stipules* ensiform. *Pedicels* 1 in., pubescent. *Calyx* ⅓ in., downy. *Petals* linear-oblong, twice the length of the calyx. *Filaments* half the length of the petals. *Ovary* ovate; style short, stigma 3-cleft. *Capsule* 6-winged, rounded, wings netted, villose. *Seeds* 1–4 in each cell.

Var. *mollis*; petiole and under surface of leaves pubescent. Berrya mollis, *Wall. Cat.* 1186; *Kurz in Journ. As. Soc. Beng.* 1873, ii. 62.—Attran.—The wood is used for building, and is sometimes called Trincomalee wood.

6. GREWIA, Linn.

Trees or shrubs more or less stellate-pubescent. *Leaves* entire, 1–9-nerved. *Flowers* axillary, few or more numerous and panicled. *Sepals* distinct. *Petals* 5, glandular at the base, sometimes 0. *Stamens* many on a raised torus. *Staminodes* 0. *Ovary* 2–4-celled, cells opposite the petals, 2–many-ovuled; style subulate, stigma shortly lobed. *Drupe* fleshy or fibrous, entire, or 2–4-lobed; stones 1–4, 1–2-seeded, with false partitions between the seeds. *Seeds* ascending, albumen fleshy or rarely 0; cotyledons flat.—Distrib. A genus of about 60 species, for the most part confined to the hotter regions of the old world. Some of the Indian species are endemic, others common to tropical Africa, &c. The synonymy of some of the species is extremely involved, and the genus requires a complete re-examination. The structure of the drupes and seeds in particular requires fuller investigation than is possible in herbarium specimens which are often incomplete.

Sect. I. **Grewia** proper. *Flowers* axillary or terminal. *Fruit* fleshy or crustaceous usually lobed.

* *Inflorescence usually terminal or extra-axillary.*

1. **G. columnaris,** *Sm.*; *DC. Prodr.* i. 510; shrubby, leaves scabrous oblong shortly acuminate glandular-serrate, cymes extra-axillary and terminal, flower-buds conical sulcate, drupes turbinate 4-lobed bristly. *Wight Ic.* t. 44; *W. & A. Prodr.* i. 76; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 26. G. orientalis, *Vahl Symb.* i. 34, *ex W. & A. l.c.* G. pilosa, *Wall. Cat.* 1112 C, D, E, F, *not of Lam.* G. bracteata, *Miq. Pl. Hohen.* G. obtusa, *Wall. Cat.* 1103, *partly.* G. carpinifolia, *Wall. Cat.* 1093.

Western Peninsula, Bengal and Ceylon.—Distrib. Java, East tropical Africa.

A shrub. *Branches* virgate, stellate-hairy. *Leaves* 2–3 by 1–1½ in., coriaceous, glabrescent, base rounded, 3-nerved, secondary nerves arched; petiole ⅙–¼ in. *Flowers* white, in terminal corymbose cymes. *Peduncles* twice the length of the petiole, 3–5-flowered, pedicels supported by small subulate deciduous bracts. *Sepals* ⅓ in., linear, yellow, 3-nerved. *Petals* half the length of the calyx, ovate-lanceolate, entire. *Torus* short, villous. *Ovary* villous. *Drupes* ½ in. diam., purplish; stones 4, 2-celled.

2. **G. emarginata,** *W. & A. Prodr.* i. 79; shrubby, leaves stellate-hairy above pubescent beneath roundish-obovate cordate gland-toothed, peduncles mostly terminal much longer than the petiole, flower-buds ovate-oblong not striated, drupes glabrescent, stones 4 1–2-seeded. G. carpinifolia, *Roth Nov. Sp.* 245, *partly; Wall. Cat.* 1093 B, *partly*. G. orientalis, *Wall. Cat.* 1093 B, G. G. involucrata, *Wall. Cat.* 1093, C.

WESTERN PENINSULA; Mysore, Courtallum, Pulney and Nilghiri Mts., *Wight*, &c.

Leaves 2–2½ by 1¾–2 in., base 3-nerved, secondary nerves not arched, petioles ½ in. *Stipules* subulate. *Peduncle* 1½ in., 3–6-branched, pedicel ½–¾ in. *Bracts* linear-subulate. *Flowers* 1 in. diam. *Sepals* linear-lanceolate. *Petals* linear-oblong, emarginate, shorter than the sepals. Torus elongate. *Style* clavate, stigma 4-lobed. *Drupe* the size of a large pea, yellowish, subglobose, turbinate, 4-lobed.

3. **G. oppositifolia,** *Roxb. Fl. Ind.* ii. 583; a tree, leaves scabrous above pubescent beneath broadly ovate-lanceolate acuminate, cymes umbellate opposite the leaves, drupes 1–4-lobed, stone 1-celled 1-seeded. *Wight Ic.* t. 82; *Wall. Cat.* 1101; *Miq. Fl. Ind. Bat.* i. pt. 2, 204.

Common and indigenous, wild in the N.W. Himalaya, from Jamu to Nipal, ascending to 7000 ft.; also frequently cultivated.

Bark ash-coloured. Herbaceous portions rough with stellate hairs. *Leaves* 3 by 1½ in., distichous, crenate-serrate, lower serratures glandular, base rounded, 3-nerved, secondary nerves scarcely arched, tertiary veins parallel conspicuous; petiole ⅓ in., pilose. *Stipules* caducous, linear-lanceolate, longer than the petioles *Peduncles* opposite the leaf, sometimes terminal, rarely axillary, much longer than the petioles; pedicels shorter than the peduncle, clavate, with small bracteoles at the base. *Flower-buds* cylindric, obovate-oblong, pilose sulcate-striate. *Flowers* yellowish. *Sepals* ¾ in., linear, 3-nerved. *Petals* oblong, entire, half the length of the sepals. *Torus* hairy, scarcely longer than the glands. *Ovary* 2-celled, cells 2-ovuled, stigma 2-lobed. *Drupe* glabrescent, blackish, lobes the size of a small pea.—The leaves are used as fodder, the bark for cordage, and the wood for various purposes.

4. **G. orientalis,** *Linn.; DC. Prodr.* i. 510; shrubby, often scandent, leaves glabrescent elliptic-lanceolate acuminate, peduncles axillary and terminal twice the length of the petiole, petals lanceolate entire, drupe globose scarcely lobed. *Roxb. Fl. Ind.* ii. 586; *Roth Nov. Sp.* 242; *W. & A. Prodr.* i. 76; *Wall. Cat.* 1100 A, B, D, E; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 26. G. obtusa, *Wall. Cat.* 1103, *partly*. G. rhamnifolia, *Roth Nov. Sp.* 244; *Wall. Cat.* 1100 C. G. ovalifolia, *Wight in Wall. Cat.* 1103 B, C. G. pilosa, *Wall. Cat.* 1112, *partly*.

SOUTHERN PROVINCES of the WESTERN PENINSULA, *Wight;* CEYLON.

Branches virgate, thinly stellate-hairy. *Leaves* 3–4 by 1–1½ in., base tapering or slightly cordate, 3-nerved, arch-veined, veins with appressed simple hairs, margins serrulate; petiole ½ in. *Cymes* umbellate; pedicels shorter than the flowers, each with a small subulate bracteole at the base. *Flower-buds* ovoid, pilose, ribbed. *Sepals* nearly 1 in., linear, yellow, pubescent outside. *Petals* half as long as the sepals, lanceolate, entire. *Torus* hispid, short. *Drupes* yellow, wrinkled, the size of a small cherry, pilose; stones 4, 2–3-celled.—The Ceylon specimens are referred with doubt to this species, as I have not seen the fruit.

5. **G. umbellata,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 591; shrubby, scandent, leaves glabrescent above thinly stellate-hairy beneath elliptic acuminate, cymes umbellate terminal and axillary, drupe 1-celled 1-seeded. *Wight Ic.* t. 83; *Wall. Cat.* 1084. G. pedicellata, *Roxb. Fl. Ind.* ii. 585; *Wall. Cat.* 1084 B.

Western Peninsula, Concan and Coromandel; Eastern Peninsula, Malacca, Penang, and Sincapur, *Maingay*, *Griffith*, &c.—Distrib. Philippines, Sumatra.

Branches virgate, thinly stellate-hairy. *Leaves* 5 by 2 in., base rounded, 3-nerved, veins not prominent, not arched; petiole ⅙–¼ in. *Peduncle* longer than the petiole, pedicels divergent. *Flower-buds* narrow, oblong, pilose, striated. *Sepals* ½ in. *Petals* narrow, entire, shorter than the sepals, springing from the back of a thickened claw. *Torus* prolonged, terete, pilose. *Drupe* the size of a cherry, stellate-hairy, obscurely lobed, purplish.

6. **G. heterotricha,** *Mast.*; arborescent, leaves scabrous elliptic acuminate crenate-serrate, peduncles opposite the leaves and terminal twice the length of the petiole, buds obovoid, torus elongate sulcate.

Western Peninsula, in Kurg, *G. Thomson.*

A shrub or small tree? Young shoots stellate-hairy, ferruginous. *Leaves* 4 by 2 in., stellate-hairy; petiole ½ in., densely pilose, hairs simple. *Stipules* subulate, equal to the petiole, with simple hairs. *Peduncles* 3-flowered, stellate-hairy, pedicels shorter than the flower. *Bracts* subulate. *Flowers* 1 in. diam. *Sepals* linear-oblong, 3-nerved. *Petals* lanceolate, half the length of the sepals. *Torus* and ovary clothed with simple hairs. *Anthers* glabrous. *Stigma* clavate, 5-lobed.—The only specimens known to me were gathered by collectors employed by G. Thomson, Esq., of Madras, about the year 1845.

7. **G. populifolia,** *Vahl; DC. Prodr.* i. 511; shrubby, leaves glabrous unequally crenate-serrate, base roundish or cuneate, peduncle solitary or twin opposite the leaves, drupe 1–4-lobed, stones 1–4 1–2-celled; *W. & A. Prodr.* i. 80; *Boiss. Fl. Orient.* i. 843; *Wall. Cat.* 1088 B? C? G. betulæfolia, *Juss. in Ann. Mus.* iv. 92, t. 2, f. 1; *Roth Nov. Sp.* 249. G. rigida, *Ham. in Wall. Cat.* 1088 D.

Sindh, *Stocks, Dalzell,* &c.; Panjab, *Aitcheson,* &c.; Western Peninsula, Concan, Nilghiris, &c.—Distrib. Affghanistan, Arabia, Tropical Africa, Mauritius.

A much and intricately branched shrub; herbaceous portions more or less stellate-hairy, ultimately glabrescent. *Leaves* ½–1½ by 1¼ in., coriaceous, multiform, often cuneate-obovate, base 3–5-nerved; secondary nerves obscure, not arched; petiole ½ in. *Peduncles* longer than the petiole. *Sepals* ½–¾ in., linear-oblong. *Petals* white, notched, shorter than the sepals. *Torus* short. *Ovary* hoary, ultimately glabrescent. *Drupes* yellowish, generally 2-lobed, lobes the size of a small pea, orange-red.—The acid fruit is eaten under the name of "Gingo."

** *Inflorescence axillary very rarely extra-axillary.*

† Leaves hoary, at least beneath.

8. **G. excelsa,** *Vahl; DC. Prodr.* i. 509; shrubby, leaves glabrous above hoary beneath ovate-oblong or lanceolate acuminate serrulate, peduncles 2–3 axillary much longer than the petiole, petals entire, drupe globose pubescent. *Wall. Cat.* 6307 A; *Roxb. Fl. Ind.* ii. 586. G. Rothii, *DC. Prodr.* i. 509; *W. & A. Prodr.* i. 78. G. bicolor, *Roth Nov. Sp.* 240, *not of Juss.* G. salvifolia, *Roxb. Fl. Ind.* ii. 587; *Wall. Cat.* 1091.

Eastern Bengal, Assam, Sikkim, and Chittagong; Bundelkund, *Edgeworth;* Coromandel, *Roxburgh.*—Distrib. Tropical Africa.

Leaves 4–5 by 1½ in., finely serrulate, base rounded, 5-nerved, nerves arched transverse ones prominent, tip obtuse or acute; petiole ⅓–¼ in. *Stipules* linear-ligulate, longer than the petiole. *Flowers* ¼–⅓ in. diam. *Sepals* linear. *Petals* oblong, half the length of the sepals. *Drupe* the size of a pea; nuts 2-celled.—Possibly not specifically distinct from *G. salvifolia*, Heyne. The fruit is agreeable.

9. **G. salvifolia,** *Heyne in Roth Nov. Sp.* 239; leaves glabrescent hoary beneath entire or minutely serrate, peduncles 1–3 axillary clustered longer than the petiole, petals 2-fid, drupe 1–4-lobed. *W. & A. Prodr.* i. 77. G. bicolor, *Juss. in Ann. Mus.* iv. 90, t. 50, f. 2; *Boiss. Fl. Orient.* i. 844. G. araria, *Wall. Cat.* 6308?

North West provinces from the JHELUM to NIPAL, *Hamilton*, &c.; WESTERN PENINSULA, *Heyne*, &c.—DISTRIB. Tropical Africa.

A shrub or small tree; bark grey, herbaceous portions covered with soft hoary pubescence. *Leaves* 2½ by 1½ in., base 3-nerved, transverse nerves indistinct; petiole ¼ in. *Stipules* ⅓ in., subulate. *Peduncles* 2 in., pedicels ¼ in. *Buds* ovate-oblong, striated. *Sepals* ¼ in., linear, 3-nerved. *Petals* ⅛ in., obovate, 2-fid, limb yellow from the back of the thickened claw. *Ovary* pubescent; style as long as the stamens.—Wight and Arnott describe the petals as entire, probably from confounding the present species with *G. Rothii.*

10. **G. orbiculata,** *Rottl. in Nov. Act. Nat. Cur. Berol.* 1803, 205; shrubby, leaves cordate roundish elliptic or oblong pubescent on both surfaces hoary beneath minutely toothed, peduncles tufted longer than the petiole, flower-buds subglobose or oblong, drupes slightly 2-lobed, stones 1–2 2-celled. *Roth Nov. Sp.* 246; *Wall. Cat.* 1085 *and* p. 237, 1085 C. G. rotundifolia, *Juss. in Ann. Mus.* iv. 92, t. 50, f. 3; *Wight Ic.* t. 45; *W. & A. Prodr.* i. 80; *Wall. Cat.* 1085. G. orbicularis, *G. Don Gen. Syst.* i. 550. G. variabilis, *Wall. Cat.* 1087.

WESTERN PENINSULA; Concan, Malabar, &c.

A shrub; branches virgate. *Leaves* 1–2½ by ½–1½ in., subsessile, base often oblique, 5-nerved, nerves arched. *Cymes* umbellate; peduncles pilose, 3-flowered; pedicels shorter than the peduncles, divaricate. *Bracteoles* minute, pinnatifid. *Buds* ovoid oblong striated. *Flowers* yellow, ½ in. diam. *Sepals* linear. *Petals* notched, half the length of the sepals. *Torus* glabrescent, very short. *Ovary* villous. *Drupe* greyish, pilose.—The *G. orbiculata,* of Wall. Cat. 1085 D, may prove a distinct species. It has smaller flowers and very small glands to the petals.

11. **G. tiliæfolia,** *Vahl Symb.* i. 35; a tree, leaves hoary beneath oblique cordate, stipules leafy falcate acuminate, auricled, flower-buds oval-oblong, drupe 1–4-lobed small subglobose, stones 3–6-celled. *W. & A. Prodr.* i. 80; *Roxb. Fl. Ind.* ii. 587; *Wall. Cat.* 1094; *Dalz. & Gibs. Bomb. Fl.* 26; *Beddome Fl. Sylvat.* t. 108; *Thwaites Enum.* 32. G. arborea, *Roth Sp. Nov.* 247. G. variabilis, *Wall. Cat.* 1087, *partly.* G. subinæqualis, *Wall. Cat.* 1087 E.

Hot dry forests throughout WESTERN INDIA, ascending to 4000 ft. in the Himalaya. WESTERN PENINSULA; BIRMA, CEYLON.—DISTRIB. East Tropical Africa.

A moderate tree, branches purplish. *Leaves* 4 by 2 in., dentate, base 3–5-nerved, feather veined; petiole ½–1 in., pubescent, thickened at the top. *Peduncles* 3–10, axillary, tufted, as long as, or longer than, the petiole Pedicels 3, divergent, shorter than the peduncle. *Sepals* ¼–½ in., oblong. *Petals* oblong, emarginate, half the length of the sepals. *Torus* slender, glabrous. *Drupe* blackish, the size of a small pea.—Fruit eaten by the natives. The stipules form the best distinguishing mark of this species.

12. **G. asiatica,** *L.*; *W. & A. Prodr.* i. 79; arborescent, leaves roundish coarsely and irregularly toothed subacuminate oblique, stipules subulate ensiform, buds club-shaped, drupes subturbinate with 1 or 2 1-celled nuts. *Roxb. Fl. Ind.* ii. 586; *Wall. Cat.* 1089; *Boiss. Fl. Orient.* i. 844; *Dalz. & Gibs. Bomb. Fl.* 26. G. subinæqualis, *DC. Prodr.* i. 511; *Wall. Cat.* 1087 C.

Generally cultivated in India, except in the Gangetic plains and E. Bengal; said to be indigenous in the Salt Range, Poonah, and Oudh. CEYLON.

A small tree, herbaceous portions covered with soft yellowish pubescence. *Leaves* 2–7 in., obliquely cordate, base 5-nerved, smaller nerves not arched, prominent beneath, transverse ones parallel; petiole ½ in, thickened at the top. *Stipules* nearly as long as the petiole. *Peduncles* 2 or more, usually shorter, sometimes longer, than the petioles, dividing into 2 or more divergent pedicels. *Bracts* linear. *Flowers* ¾ in. diam. *Sepals* oblong-lanceolate. *Petals* yellow, linear-oblong, half the length of the sepals. *Drupe* globose, 1–2-lobed, pilose, about the size of a pea.—A very variable plant, the following form is usually held to be distinct:—

VAR. *vestita*, Wall. Cat. 1105 (sp.); leaves obovate acuminate obscurely 3-lobed minutely serrate, cymes densely crowded, buds ovoid not striated. G. asiatica, *Wall. Cat.* 1089, *partly*. G. elastica, *Royle Ill.* t. 22. G. obtecta, *Wall. Cat.* 1114.—Tropical Himalaya, from Garwhal to Sikkim, Pegu.

13. **G. sapida,** *Roxb. Fl. Ind.* ii. 590; shrubby, leaves subsessile ovate or orbicular doubly-serrate pilose above pubescent beneath, stipules linear, peduncles 2–5-flowered, drupes subglobose slightly 4-lobed, stone 2-seeded. *Wall. Cat.* 1115. G. nana, *Wall. Cat.* 1102. G. suffruticosa, *Ham. in Wall. Cat.* 1102 B, G. G. pumila, *Ham. in Don Prodr.* 227.

TROPICAL HIMALAYA, from Garwhal to Bhotan, and ASSAM.

A decumbent shrub; stock woody, subterranean, sending up annually a number of herbaceous pubescent shoots, 12–14 in. *Leaves* 1¾ in. by 3 in., base 5-nerved, secondary nerves not arched; petiole ¼ in. *Stipules* linear-subulate, as long as the petiole. *Peduncles* 2–3, 1 in.; pedicels divaricate, shorter than the petiole. *Flower-buds* oblong. *Flowers* yellow, ½ in. diam. *Sepals* oblong. *Petals* yellow, entire, half the length of the sepals. *Torus* glabrescent. *Drupes* the size of a pea, obscurely lobed.—The shoots are usually burnt by the jungle fires after flowering. Roxburgh describes the petals as 2-toothed, the stone as 1–3-seeded, and the leaves as scabrid.

†† Leaves not hoary beneath.

0 *Drupe globose, rind crustaceous.*

14. **G. scabrophylla,** *Roxb. Fl. Ind.* ii. 584; shrubby, leaves scabrous above pubescent beneath roundish ovate irregularly serrate, peduncles 1–4 axillary equalling the petiole 2–3-flowered, drupe globose tomentose with a crustaceous rind. G. sclerophylla, *Wall. Cat.* 1095; *Wight Ic.* t. 89. G. Carrea, *Ham. in Wall. Cat.* 1095 B. G. sulcata, *Wall. Cat.* 1096. G. pilosa, *Wall. Cat.* 1112, *partly*. G. obliqua, *Roxb. Fl. Ind.* ii. 590? *not of Juss.*

TROPICAL HIMALAYA; GARWHAL, *Falconer;* SIKKIM, alt. 2–300 ft., *Hk. f.;* ASSAM, CHITTAGONG, and AVA, *Wallich*, &c.

A small shrub, herbaceous portions pubescent. *Leaves* 3–6 by 4 in., often slightly lobed, base 3–5-nerved, secondary nerves not arched, prominent beneath; petiole ½ in. *Stipules* subulate. *Cymes* umbellate, pedicels diverging, longer than the peduncles. *Bracteoles* linear-subulate, deciduous. *Flower buds* ovate-oblong, ribbed. *Flowers* ¾ in. *Sepals* linear-lanceolate pubescent. *Petals* obovate, white, notched, half the length of the sepals or less. *Torus* short, hispid. *Ovary* hairy, 2-celled, cells 4–6-ovuled. *Drupe* the size of a large cherry, stellate-hairy; stones 4, 1-celled, 1-seeded.

15. **G. carpinifolia,** *Juss. in Ann. Mus.* iv. 91, t. 51, f. 1; arborescent, leaves 3-nerved oval acute thinly stellate-hairy crenate-serrate, peduncles exceeding the short petiole, flower-buds elliptic dilated at the base, anthers smooth, drupe globose glabrescent. G. pilosa, *Wall. Cat.* 1112, *partly.*

WESTERN PENINSULA, Pondicherry.—DISTRIB. Tropical Africa.

A small tree. *Leaves* 3 by 1½ in., glabrescent above, thinly stellate-hairy along the nerves beneath; petiole ¼ in. *Peduncles* 3-flowered, pedicels short. *Flower-buds* pilose. *Sepals* oblong-lanceolate. *Petals* oblong, half the length of the sepals.

16. **G. pilosa,** *Lam. Dict.* iii. 43, *excl. syn.;* shrubby, leaves subsessile scabrous cuneate-obovate or lanceolate, peduncles 1–3 as long as the petiole, drupe hairy 1–4-lobed. *W. & A. Prodr.* i. 78; *Dalz. & Gibs. Bomb. Fl.* 26. G. carpinifolia, *Roxb. Fl. Ind.* ii. 587; *Wall. Cat.* p. 237, 1113 C, *partly, not of Juss.; Roth Nov. Sp.* 245, *partly.* G. involucrata, *Wight in Wall. Cat.* 1093 C. G. commutata, *DC. Prodr.* i. 511. G. flavescens, *Juss. in Ann. Mus.* iv. 91; *Wall. Cat.* p. 237, 1113 D. G. bipartita, *Wall. Cat.* p. 237, 1113 B. G. scabrida, *Wall. Cat.* 1113. G. orientalis, *Gærtn. Fruct.* ii. t. 106?

Central and Southern India; from Guzerat to Behar, and southwards to Maisor.—Distrib. Tropical Africa.

A small tree or shrub, herbaceous portions rough with stellate hairs. *Leaves* 2–4 by 1–1½ in., scarcely acuminate, unequally serrate, softer beneath, base rounded or subcordate, 3-nerved, secondaries arched; petiole very short, pilose. *Stipules* subulate, acuminate. *Peduncles* axillary, ¼ in.; pedicels as long as the peduncle. *Flower-buds* oblong, dilated at the base, constricted in the middle. *Sepals* linear. *Petals* linear, 2-fid, one-third shorter than the sepals. *Torus* glabrous, scarcely exceeding the glands. *Anthers* and style stellate-hairy. *Stigma* 4-parted. *Ovules* numerous. *Drupe* reddish-brown, the size of a large pea, mesocarp fibrous; stones 1–4, 1–3-celled, pitted.—Very great confusion exists in books and herbaria as to the synonymy of this and some nearly allied species.

Several distinct species are called *G. pilosa* in Wallich's herbarium, and the labels have in all probability been shifted; moreover, it sometimes happens that two or three different plants are included under the same letter.

17. **G. villosa,** *Willd. in Nov. Act. Nat. Cur. Berol.* 1803, 205; shrubby, leaves rugose above villous beneath suborbicular obliquely cordate serrate, serratures ciliate, peduncles very short, drupe 4-stoned rind crustaceous. *DC. Prodr.* i. 512; *W. & A. Prodr.* i. 79; *Wall. Cat.* 6306; *Dalz. & Gibs. Fl. Bomb.* 25. G. corylifolia, *Guill. & Perr. Fl. Seneg.* i. 95, t. 20. G. orbiculata, *G. Don Gen. Syst.* i. 551, *not of Rottler.*

Western and Southern India, from Sindh and the Panjab to Travancor.—Distrib. Cape de Verde Islands, Tropical Africa.

Herbaceous portions covered with long soft hairs. *Leaves* 1–3 in., apex acuminate or rounded, base 5-nerved, nerves prominent villous, secondary nerves not arched; petiole ½–1 in. *Stipules* broad, leafy. *Flowers* nearly sessile, in close tufts, sometimes opposite the leaves. *Bracts* oblong. *Sepals* oblong, acute, villous. *Petals* dull yellow, oblong, notched, much shorter than the sepals. *Drupe* globose, coppery, pilose, the size of a cherry; stones 4, 1–2-seeded.

00 *Drupes fleshy didymous.*

18. **G. multiflora,** *Juss. in Ann. Mus.* iv. 89, t. 47, f. 1; shrub or tree, leaves shortly petioled lanceolate glandular-serrate peduncles much exceeding the petiole 3-flowered, flower-buds oblong-clavate, petals entire, drupes 2-lobed. *Miq. Fl. Ind. Bat.* i. pt. 2, 200. G. sepiaria, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 589; *Wall. Cat.* 1104, *partly.* G. serrulata, *DC. Prodr.* i. 510. G. coriacea, *Garcke in Pl. Hohenack. exsicc.* 1132.

Eastern Bengal, Assam, the Sikkim Himalaya, and Khasia Mts., ascending to 4000 ft.; Western Peninsula, Nilghiri Mts.; Singapore.—Distrib. Malay Archipelago, East Tropical Africa.

Branches slender, sparingly hairy. *Leaves* distichous, variable in shape and size, glabrescent, apex sometimes acuminate, base 3-nerved; petiole very short, pilose. *Stipules* linear-subulate, as long as the petiole. *Peduncles* half the length of the leaves, pilose; pedicels dilated upwards. *Sepals* ½ in., linear-oblong. *Petals* half the length of the sepals, entire. *Drupe* the size of a small pea, purplish, glabrescent; stones 1-seeded.—Doubtful if distinct from *G. lævigata*; used as a hedge plant.

19. **G. lævigata,** *Vahl Symb.* i. 34; arborescent, leaves shortly petioled glabrescent tapering to both ends acuminate serrate, peduncles much exceeding the petiole, flower-buds oblong obtuse, drupe 2-lobed. *W. & A. Prodr.* i. 77; *Wall. Cat.* 1086 H; *Miq. Fl. Ind. Bat.* i. pt. 2, 199. G. ovalifolia, *Juss. in Ann. Mus.* iv. 90. G. didyma, *Roxb. Fl. Ind.* ii. 591; *Wall. Cat.* 1086, *partly.* G. disperma, *Rottl. in Spreng. Syst.* ii. 579. G. mollococca, *Ham. in Wall. Cat.* p. 237, 1086 F. G. Lalpeta, *Ham. in Wall. Cat.* p. 237, 1086 G.

Eastern and Southern India, from Nipal, Sikkim, and the Khasia Mts., through both Peninsulas, Ava, and Martaban.—Distrib. Tropical Africa, Malay Islands, Australia.

Herbaceous portions thinly stellate-hairy. *Leaves* 3½-4½ by 1¼-1¾ in., 3-nerved, nerves pilose beneath, secondaries arched; petiole ½ in. *Stipules* linear-subulate. *Buds* ovoid-oblong, striated, as long as the petiole. *Peduncles* 2 or 3 together, 2–3-flowered. *Bracts* linear-subulate. *Sepals* ½–¾ in., 3-nerved. *Petals* oblong-lanceolate, entire, yellow, half the length of the sepals. *Torus* glabrous, short. *Style* longer than the stamens. *Drupe* smooth, 1–4-lobed, the size of a small pea, black when ripe; stones 1-celled.—Closely allied to *G. multiflora*, but has larger flowers.

000 *Drupes fleshy* 1–4-*lobed.*

20. **G. Ritchiei,** *Mast.*; arboreous, leaves glabrescent ovate-lanceolate glandular-serrate 3-nerved, peduncles cymose axillary and terminal, buds oblong subclavate, torus as long as the entire petals sulcate, drupe deeply 4-lobed.

Concan, *Stocks*; Western Ghauts, *Ritchie.*

Young branches stellate-hairy. *Leaves* 3 by 1½ in., coriaceous, glabrous above, thinly stellate-hairy beneath, base rounded, smaller nerves arching, petiole pilose, 1/12–1/6 in. *Peduncles* half as long as the leaves, pedicels pilose. *Sepals* linear-oblong. *Petals* white, narrow-pointed, shorter than the sepals. *Style* exceeding the stamens. *Drupe* purplish, ½ in. diam.; stones 1-seeded.—Allied to *G. columnaris*, but differs in the oblong buds, very long torus, and deeply lobed fruit.

21. **G. bracteata,** *Roth Nov. Sp.* 243; shrubby, leaves glabrescent scabrous beneath oval-lanceolate, peduncles equalling the short petioles, drupe 4-lobed, stones 2–3-celled. *W. & A. Prodr.* i. 76. G. obtusa, *Wall. Cat.* 1103, *partly.*

Western Peninsula, in the Carnatic, *Heyne*; Ceylon.

Leaves 3–4 by 1½–1¾ in., somewhat oblique, serrate, base rounded, 3-nerved, secondaries arched, with straight hairs along the nerves beneath; petiole ⅓ in. *Peduncles* solitary or twin, axillary, 3-flowered. *Bracts* broad, pilose, as long as the peduncle. *Buds* conical or ovoid, pilose, sulcate. *Sepals* linear, covered with golden down. *Petals* much shorter than the sepals, oblong, entire, recurved. *Torus* prolonged beyond the glands. *Drupe* shrivelled when dry, the size of a cherry, covered with yellow hairs.—Some specimens, labelled as from Assam, but probably from the Calcutta Bot. Gardens, are slightly more scabrous.

22. **G. scabrida,** *Wall. Cat.* 1113, *partly*; shrubby, leaves pilose or glabrescent elliptic acute dentate, peduncles axillary cymose, much longer than the petiole, flower-buds cylindric-oblong ribbed, torus longer than the glands, drupe 4-lobed. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 63. G. pilosa, *Wall. Cat.* 1112, *partly.* G. ferruginea, *Hochst. in A. Rich. Fl. Abyss.* i. 87? G. odorata, *Blume ex Walp. Rep.* i. 361. G. acuminata, *Juss. in Ann. Mus.* iv. 91, t. 48.

EASTERN PENINSULA, from Tenasserim, *Helfer*, to Malacca.—DISTRIB. Malay Archipelago, West Tropical Africa, Abyssinia.

A climbing shrub? *Branches* rusty stellate-hairy. *Leaves* 4–6 by 2–2½ in., base rounded, 3-nerved, transverse nerves prominent; petiole ½ in., rusty tomentose. *Stipules* subulate-lanceolate. *Peduncle* 3–4 times longer than the petiole, floccose-tomentose. *Sepals* ¾ in. and upwards, pilose. *Petals* oblong, entire or erose, less than half the length of the sepals, blade from the back of a thick glandular claw. *Torus* villous, angular, sulcate. *Drupe* glabrescent, the size of a cherry, purplish, mesocarp fibrous; stones 1-seeded.—Variable in size of parts, and in quality of pubescence.

23. **G. abutilifolia,** *Juss. in Ann. Mus.* iv. 92; arboreous, leaves scabrous roundish base cordate or rounded irregularly toothed or lobed, peduncles clustered axillary half the length of the petiole, petals entire, drupe 1–4-lobed pubescent. *W. & A. Prodr.* i. 79; *Wall. Cat.* 1092; *Dalz. & Gibs. Bomb. Fl.* 26. G. aspera, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 591; *Wall. Cat.* 1092 B, C, D, E. G. macrophylla, *G. Don Gen. Syst.* i. 549. G. asiatica, *Wall. Cat.* 1089, *partly, not of others.*

WESTERN PENINSULA, from the Circars and Kurg to Malabar.—DISTRIB. Java.

A small tree, herbaceous portions scabrid, stellate-hairy. *Leaves* 3–4 by 2½–3 in., thinly stellate-hairy on both surfaces base 3-nerved, smaller nerves parallel, straight; petiole ½ in. *Cymes* contracted, peduncles 3–4-flowered. *Buds* oblong, pilose. *Flower* ¾ in. diam. *Sepals* ⅓ in., oblong. *Petals* much shorter than the sepals, oblong, entire. *Ovary* hispid; style as long as the stamens. *Drupes* yellow, subglobose or turbinate, obscurely 4-lobed, the size of a large pea; stones 4 or fewer, 1–2-celled.

24. **G. diplocarpa,** *Thwaites Enum.* 31; shrubby, leaves oblong-lanceolate acuminate crenate-serrate, peduncles 3-flowered as long as the petiole, drupe 4-lobed pilose.

CEYLON; Matturatte and Oova, alt. 3000 ft., *Thwaites.*

Herbaceous portions clothed with simple appressed rigid hairs. *Branches* purplish. *Leaves* 3–4 by 1¼–1¾ in., tapering at the base, glabrescent or sparingly pilose along the nerves, secondary nerves not arched; petiole ¼–⅓ in., hairy. *Stipules* subulate, lanceolate. *Peduncles* axillary, pedicels shorter than the peduncle. *Bracts* subulate, as long as the pedicels. *Buds* cylindric-oblong. *Sepals* linear. *Petals* lanceolate, acute, half the length of the sepals, limb scarcely longer than the claw. *Stigma* 4-lobed.

25. **G. microstemma,** *Wall. Cat.* 1109; shrubby, leaves scabrous broadly lanceolate acuminate coarsely and unequally serrate, cymes tufted, buds oblong striated, drupe subglobose 1–4-lobed. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 63.

PEGU and BIRMA on the Irrawaddy, and at Prome, *Wallich, Griffith,* &c.

Young shoots scabrous; branches terete, stellate-hairy *Leaves* 5–7 by 2¼ in., base rounded, 3-nerved, secondary nerves not arched; petiole ¼ in., hairy. *Stipules* subulate-acuminate, as long as the petiole. *Cymes* axillary, many-flowered; peduncles very short. *Buds* oblong, striated. *Sepals* ⅓ inch, linear, 1-nerved. *Petals* linear, subentire, shorter than the sepals. *Torus* glabrous, scarcely exceeding the claw of the petals. *Drupe* the size of a large pea, purplish, glabrescent.

26. **G. humilis,** *Wall. Cat.* 1110; shrubby, leaves downy ovate or roundish acute, petiole and peduncle very short, drupe turbinate obscurely lobed. G. pilosa, *Wall. Cat.* p. 237, 1112 G. G. retusifolia, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 294.

AVA, on the Irrawaddy, *Wallich; BIRMA, Kurz.*

Branches downy. *Leaves* 1½–2 by 1–2 in., 3–5-nerved, feather-veined, secondary nerves transverse parallel; petiole very short. *Stipules* linear. *Peduncle* axillary, hairy, slightly longer than the petiole, dividing above into 2 or 3 short diverging pedicels. *Ripe fruit* wrinkled, glabrescent, on a very short hispid torus.—Near *G. hirsuta*, but differing in the broader leaves and smaller fruit.

27. **G. hirsuta,** *Vahl Symb.* i. 34; shrubby, leaves glabrescent or pilose above densely tomentose beneath lanceolate acuminate, peduncles 1–3, drupe subglobose 4-lobed. *W. & A. Prodr.* i. 78; *Roxb. Fl. Ind.* ii. 587; *Wight Ic.* t. 76; *Thwaites Enum.* 31; *Wall. Cat.* p. 237, 1091 B. G. pilosa, *Roxb. Fl. Ind.* ii. 588, *not Lam.* G. salvifolia, *Wall. Cat.* 1091, *not of Roth.* G. helicterifolia, *Wall. Cat.* 1090 C; *Thwaites Enum.* 31. G. Roxburghii, *G. Don Gen. Syst.* i. 548, *excl. syn.* G. saxatilis, *Ham. in Wall. Cat.* 1091 E. G. Sulcoria, *Ham. in Wall. Cat.* 1090 D. G. longifolia, *Ham. in Wall. Cat.* 1090 E.

Southern provinces of the WESTERN PENINSULA; CEYLON.

Branches stellate-hairy. *Leaves* distichous, 2½–3 by 1¼–1½ in., base 3-nerved, oblique, rounded, irregularly serrate, wrinkled; petiole ½ in., hairy, thickened at the top. *Stipules* linear, as long as the petiole. *Peduncles* 1–3, axillary, 2–4-flowered, pedicels very short. *Flower-buds* oblong, obtuse, pilose. *Flower* ½ in. diam., white, subsequently yellow. *Sepals* lanceolate. *Petals* oblong, entire, half as long as the sepals. *Drupe* glabrescent, the size of a small cherry; stones 4, 2-celled.—Roxburgh's description of the stones of this plant being 1-celled is probably erroneous, as shown by Wight and Arnott.

28. **G. polygama,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 588; shrubby, leaves almost sessile narrow velvety beneath, flowers polygamous, drupe 4-lobed. *W. & A. Prodr.* i. 78 *under* G. hirsuta; *Wall. Cat.* p. 237, 1090 B; *Dalz. & Gibs. Bomb. Fl.* 26. G. helicterifolia, *Wall. Cat.* 1090, *partly; Thwaites Enum.* 31. G. viminea, *Wall. Cat.* 1111?. G. lanceolata, *Herb. Heyne.* G. lancifolia, *Grah. Cat. Bomb. Pl.* 21. G. hirsuta, *Wall. Cat.* p. 237, 1090 C. G. angustifolia, *Wall. Cat.* 1106?. G. biloba, *Wall. Cat.* 1107?. ?G. lanceæfolia, *Roxb. Fl. Ind.* ii. 586.

North Western India and along the Himalaya, from the SALT RANGE to NIPAL, ascending to 4000 ft.; CONCAN, PEGU, CEYLON.—DISTRIB. North Australia.

Herbaceous portions pubescent or thinly pilose; branches spreading. *Leaves* distichous, 3–4 by ½–¾ in., lanceolate, very acute, serrate, base 3-nerved, nerves not arched, secondary nerves transverse, parallel. *Stipules* subulate. *Peduncles* 1–5, axillary, about half the length of the leaf; pedicels 2–3, divergent, shorter than the peduncle. MALE fl. *Sepals* ⅙–¼ in. diam., linear, longer than the oblong entire petals. *Stamens* numerous. HERMAPHRODITE fl. *Ovary* very hairy, shortly stipitate. *Drupe* ½ in. diam., hairy, brownish; stones 4, 1-seeded.

SECT. II. **Omphacarpus.** *Inflorescence* terminal, or terminal and axillary. *Flowers* involucrate. *Drupe* with a corky or fibrous rind.

29. **G. fibrocarpa,** *Mast.*; arborescent, young shoots densely covered with brown hairs, leaves scabrous above pilose beneath, stipules laciniate, inflorescence terminal, drupe 1-celled globose tomentose outside fibrous within.

MALACCA, *Maingay, Griffith.*

A tree; herbaceous portions tomentose. *Leaves* 5–7 by 1¾–2½ in., somewhat oblique, minutely serrulate, base 3–5-nerved, nerves prominent, secondary distant; petiole ⅓ in., densely hairy. *Stipules* nearly as long as the petiole, ovate, laciniate, concave. *Flowers* numerous, in terminal cymes; peduncles longer than the petiole; pedicels divergent. *Bracts* oblong, entire, ⅓–¼ in. *Sepals* linear-oblong, very pilose, ¼ in. *Petals* linear-oblong, half the length of the sepals. *Torus* as long as the glands of the petals. *Drupe* 1 by ¾ in., stone 1-seeded.

30. **G. globulifera,** *Mast.*; shrubby, herbaceous portions floccose tomentose, leaves glabrescent oblong acuminate entire, base rounded 3-nerved, flower-heads globose, drupe 1-celled, stone cartilaginous.

MALACCA, *Griffith, Maingay.*

Leaves 8 by 3 in., glabrescent or thinly stellate-hairy, nerves prominent beneath, secondary nerves distant; petiole 1 in., thickened at the end, tomentose. *Stipules* caducous. *Inflorescence* terminal, floccose-tomentose; cymes half the length of the leaves, ultimate pedicels with 3 ovate entire bracts supporting as many flowers. *Buds* oblong. *Sepals* linear-oblong, $\frac{1}{6}$ in., tomentose. *Petals* notched, dilated at the base, shorter than the sepals. *Torus* not much longer than the petaline glands. *Drupe* 1 in., furfuraceo-tomentose, crustaceous, fibrous in the middle; stone 1-celled, 1-seeded.

31. **G. calophylla,** *Kurz in Andaman Report*, App. B, iii.; shrubby, leaves glabrous ovate-lanceolate acuminate, base rounded, drupe 2-celled.

ANDAMAN ISLES, *Kurz;* MALACCA? *Maingay.*

Leaves 6–7 by 3 in., coriaceous, entire, 3-nerved, secondary nerves distant; petiole $\frac{1}{6}$-$\frac{1}{4}$ in. *Inflorescence* terminal, pedicels articulate. *Flower-buds* cylindric, hoary, striated. *Sepals* linear-oblong. *Petals* shorter than the sepals. *Drupe* $\frac{3}{4}$ by $\frac{1}{2}$ in., obovate, tapering at the base into a stalk, coriaceous and glabrous externally, fibrous within; stones 2, 1-celled.—Kurz suggests (*Flora* 1872, 397) that *Inodaphnis lanceolata,* Miq. Flor. Ind. Bat. Supp. i. 357, from Sumatra is this plant.

32. **G. latifolia,** *Mast.*; a tree, leaves glabrescent above stellate-hairy beneath oblong acuminate inequilateral entire tapering at the base sub-3-nerved, inflorescence terminal fulvo-tomentose, drupe 1-celled.

MALACCA, *Maingay.*

Leaves 7–8 by 3$\frac{1}{2}$ in.; petiole $\frac{1}{2}$ in., pilose. *Inflorescence* cymose, peduncles half the length of the leaves, pedicels divaricate. *Drupe* ovoid, 1 by $\frac{3}{4}$ in., glabrous, rind yellow, crustaceous, middle coat fibrous; stone 1-celled, 1- or more-seeded.—I have not seen flowers of this species, which, however, appears quite distinct.

33. **G. laurifolia,** *Hook. ms.*; shrubby, leaves glabrous oblong sub-acuminate mucronate entire, inflorescence pubescent terminal and axillary.

MALACCA and PENANG, *Maingay, Griffith,* &c.—DISTRIB. Borneo.

A shrub or tree? *Branches* terete, glabrous. *Leaves* 4–6 by 1$\frac{3}{4}$ in., shining, base 3-nerved, secondary nerves very distant; petiole 1 in. *Cyme* shorter than the leaves. *Involucre* of 3 ovate dentate bracts. *Sepals* 5, pubescent. *Petals* 5, or fewer by abortion, sometimes absent. *Drupe* $\frac{1}{2}$ in., globose, yellow, 1-lobed by abortion, tapering below into a stalk of nearly equal length to itself, fibrous within; stone 3-celled. *Seed* 1 by abortion.—Fruit agreeable subacid (*Maingay*).

SECT. III. **Microcos.** *Inflorescence* terminal, in panicled cymes. *Flowers* involucrate. *Drupe* entire, fleshy (unknown in *G. sinuata*).

34. **G. sinuata,** *Wall. Cat.* 1108; shrubby, branches spreading glabrescent, leaves ovate obtuse sinuate, stipules entire as long as the very short petiole.

MARTABAN and TENASSERIM, *Wallich, Griffith,* &c.

Branches slender, rigid, widely spreading, thinly stellate-hairy when young. *Leaves* 2 by 1 in., glabrous, coriaceous, base rounded, scarcely 3-nerved, secondary nerves straight, apex obtusely acuminate; petiole $\frac{1}{6}$—$\frac{1}{12}$ in. *Stipules* subulate, as long as the petiole. *Cymes* at the ends of the branches. *Buds* obovoid, longer than the pedicels, hoary. *Sepals* oblong. *Petals* oblong, entire, half the length of the sepals. *Torus* as long as the glands. *Fruit* not seen.

35. **G. Microcos,** *L.*; *DC. Prodr.* i. 510; shrubby, leaves glabrescent ovate or obovate-lanceolate serrulate acuminate, stipules subulate-lanceolate. *W. & A. Prodr.* i. 81; *Wall. Cat.* 1098; *Wight Ill.* t. 33; *Thwaites Enum.* 32; *Miq. Fl. Ind. Bat.* i. pt. 2, 202; *Dalz. & Gibs. Bomb. Fl.* 26. G. ulmifolia, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 591; *Wall. Cat.* 1098, 1, 2, 3, *and*

p. 237, 1098 H; *Wight Ic.* t. 84. G. affinis, *Lindl. in Trans. Hort. Soc.* vi. 265. G. begonifolia, *Wall. Cat.* 237, 1098 D. G. glabra, *Jack. Mal. Misc.* i. p. 14, *ex Hook. Bot. Misc.* i. 282. Microcos paniculata, *L. ex W. & A. Prodr.* i. 81; *Wall. Cat.* p. 237, 1098 E, F. M. mala, *Ham. in Trans. Linn. Soc.* xiii. 549. M. Stauntoniana, *G. Don Gen. Syst.* i. 551.—*Rheede Hort. Mal.* i. t. 56.

EASTERN BENGAL; Khasia Mts., ascending to 4000 ft.; CHITTAGONG, BIRMA, and MARTABAN; WESTERN PENINSULA, Mysore, &c.; CEYLON.—DISTRIB. Java, China.

Leaves distichous, 5–6 by 1½ in., subcoriaceous, glabrous, or more or less stellate-hairy beneath, base 3-nerved; petiole ⅓–½ in. *Stipules* entire, half the length of the leaves. *Cymes* terminal, peduncles pubescent, pedicels hispid divergent. *Bracts* subulate. *Flowers* 2 or 3 together within the bracts. *Sepals* oblong, pubescent. *Petals* oblong, entire or slightly emarginate, thrice shorter than the sepals. *Drupe* the size of a pea, purplish, glabrous; stone hairy, 3-celled.

VAR. *rugosa;* leaves bullate. G. rugosa, *Wall. Cat.* 1098 β. Arsis rugosa, *Lour. Fl. Coch.* 409.—Pegu.

36. **G. paniculata,** *Roxb. Fl. Ind.* ii. 591; shrubby, leaves pubescent beneath oblong acuminate serrulate base cuneate, petiole short, stipules 2-partite, drupes 1–4-lobed obovoid. *Wall. Cat.* 1097, *partly; Miq. Fl. Ind. Bat.* i. pt. 2, 203. G. Blumei, *Hassk. Tijdschr. Nat. Gesch.* xii. 130; *Miq. Fl. Ind. Bat.* i. pt. 2, 203. Microcos tomentosa, *Smith in Rees Cycl.* G. affinis, *Hassk. Cat. Hort. Bog.* 207, *not of Lindl.*

MALACCA and PENANG, *Hunter, Wallich, Maingay.*—DISTRIB. Java, Philippines, Siam.

A tree? or shrub. *Leaves* 6 by 2½ in., base 5-nerved; petiole ½ in., pilose. *Stipules* nearly equalling the petiole. *Cymes* terminal, half the length of the leaves, pedicels rusty-floccose. *Bracts* divided. *Buds* subglobose or turbinate. *Sepals* oblong. *Petals* entire, much shorter than the sepals. *Fruiting-pedicels* recurved. *Drupe* the size of a large pea, pilose; stones 1-celled.

In addition to the above species, Beddome mentions a *G. umbellifera*, Bedd., from South Canara, with the following imperfect description: "Leaves oblong-ovate, very suddenly pointed asperous, heads of flowers on long stalks axillary or supra-axillary." The same author describes in Linn. Trans. xxv. 210, a species which he calls *G. acuminata* (not of Juss.), but of which I have seen no specimen. It is described as a "small tree with glabrous shoots; leaves 4–6 by 2 in. oblong acuminate entire, petiole ¼ in., stipules small subulate; peduncles very short lateral or axillary 2–5-flowered bracteolate; sepals covered with ash-coloured pubescence."

7. COLUMBIA, Pers.

Trees or shrubs. *Leaves* simple, usually oblique. *Flowers* clustered, clusters in terminal panicles. *Sepals* 5, distinct. *Petals* 5, glandular at the base. *Stamens* indefinite, free, springing from a raised torus. *Ovary* 3–5-celled, cells 2–4-ovuled; style subulate, entire. *Capsule* roundish 3–5-winged, 3–5-coccous, cocci indehiscent 1-seeded. *Seed* albuminous; cotyledons flat.—DISTRIB. A genus of about 5 species, natives of Tropical Asia.

1. **C. floribunda,** *Wall. in Voight Cat. Hort. Calc.* 128; leaves scabrous above puberulous beneath oblong acute spinuloso-denticulate base cordate. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 63. Glossospermum? quinque-alatum, *Wall. Cat.* 1154 *and* 7841.

BIRMA, at Taong Dong, *Wallich;* Ava, Martaban, *Kurz.*

A shrub; younger portions scabrid, stellate-hairy. *Leaves* 5 by 3 in., 3–7-nerved, petiole 1 in., floccose-tomentose. *Flowers* small. *Sepals* $\frac{1}{10}$ in., oblong, hoary externally. *Petals* oblong-spathulate, as long as or longer than the sepals. *Style* stellate-hairy. *Fruit* ¾–1 in. diam., 3-winged, stellate-hairy, separating when ripe into 3–5 indehiscent 1-seeded cocci.

2. **C. merguensis,** *Planch. ms.;* leaves lanceolate acuminate serrate 1–3-nerved scabrous above puberulous beneath.

TENASSERIM, at Mergui, *Griffith.*
Leaves 6–8 by 2 in.; petiole ½ in. *Fruit* 1½ in. diam., downy, 3-winged.—Imperfect specimens only seen.

8. **ERINOCARPUS,** Nimmo.

A tree. *Leaves* long-petioled, roundish-cordate, toothed, 5–7-nerved, sometimes 3-lobed. *Flowers* large, yellow, in large terminal panicles. *Sepals* 5, distinct. *Petals* 5, clawed. *Stamens* numerous, springing from a raised torus, free, or slightly united at the base. *Ovary* 3-celled, cells 2-ovuled; style filiform, stigma minute. *Fruit* indehiscent, woody, triangular, 3-winged, spiny, 1-celled by abortion. *Seed* solitary, pendulous, albumen fleshy; cotyledons ovate, flat.—The only species

1. **E. Nimmoanus,** *Grah. Cat. Bomb. Pl.* 21; *Beddome Flor. Sylvat.* t. 110; *Dalz. & Gibs. Bomb. Fl.* 27.

WESTERN PENINSULA; the Concan and Dekkan, *Stocks,* &c.
Leaves 4 by 4½ in., glabrous; petiole 1–4 in. *Stipules* caducous. *Bracts* 6–8 in., tomentose, ovate-oblong. *Flower-buds* oblong. *Flower* ⅔ in. diam. *Fruit* 2 by 1½ in.

9. **TRIUMFETTA,** Linn.

Herbs or undershrubs, generally more or less covered with stellate hairs. *Leaves* serrate, simple or lobed. *Flowers* yellowish, in dense cymes. *Sepals* 5, oblong, concave. *Petals* 5. *Stamens* 5–35, springing from a fleshy, lobed, glandular torus. *Ovary* 2–5-celled, cells 2-ovuled; style filiform, stigma 5-toothed. *Capsule* globose or oblong, spiny or bristly, indehiscent or 3–6-valved. *Seeds* 1–2 in each cell, pendulous, albuminous; embryo straight, cotyledons flat.—DISTRIB. A genus of about 40 very variable species, mostly tropical weeds.

* *Fruit* globose rarely ovoid.

1. **T. tomentosa,** *Bojer in Ann. Sc. Nat. ser.* ii. xx. 103; herbaceous or suffruticose more or less downy, leaves variable, fruit globose covered with straight spines. *Mast. in Oliv. Flor. Trop. Afr.* i. 258. T. ovata, *DC. Prodr.* i. 507 ?. T. pilosa, *Wall. Cat.* 1080. T. pilosa, var. *a*, *Thwaites Enum.* 31. T. vestita, *Wall. Cat.* 1078, 1, 2. T. indica, *Ham. in Wall. Cat.* 237, 1078 D; *W. & A. Prodr.* i. 74 T. oblonga, *Wall. in Don Prodr.* 227.

EASTERN BENGAL; Silhet, *Wallich;* SIMLA, *Govan;* Assam, *Griffith;* CEYLON.—DISTRIB. Mauritius, Madagascar, East Tropical Africa, West Indies ?
Stem hispid. *Leaves* 4 by 3 in., thinly stellate-hairy above, pubescent beneath, ovate, acuminate, sometimes lobed, crenulate, base rounded, 5–7-nerved, upper obliquely lanceolate, serrate, 3-nerved; petiole about 2 in. *Stipules* lanceolate. *Flowers* yellow, in interrupted spikes. *Sepals* apiculate, densely stellate-hairy. *Stamens* 5–7. *Fruit* the size of a large pea, hispid, spines ciliate along the lower edge, glabrous along the upper, with a straight transparent bristle-point.—It is not quite certain that the African and Indian plants are specifically identical. Perhaps only a woolly state of *T. pilosa.*

2. **T. pilosa,** *Roth Nov. Sp.* 223; herbaceous, bristly, bristles bulbous at the base, lower leaves lobed upper ovate or ovate-lanceolate unequally toothed, fruit globose tomentose covered with long hooked spines which are glabrous along the upper hispid along the lower edge. *W. & A. Prodr.* i. 74. T. pilosa, *var. β, Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 25.

T. tomentosa, *Wall. Cat.* 1078 C. T. glandulosa, *Heyne herb.; Wall. Cat.* 1077, 5. T. polycarpa, *Wall. Cat.* 1079. T. oblongata, *Link. Enum. Pl. Hort. Ber.* ii. 5; *Wall. Cat.* 1077, 1, 2, 3.

Throughout Tropical India, from NIPAL and KUMAON to AVA and MALACCA, TRAVANCOR, and CEYLON.—DISTRIB. Abyssinia, West Tropical Africa.

Upper leaves 3½–4 by 2¼ in., lower 3-lobed, stellate-hairy on both sides; petiole ¾ in., villous. *Stipules* subulate-aristate, shorter than the petiole. *Peduncles* shorter than the petiole. *Flowers* ¾ in., yellow. *Sepals* linear, apiculate. *Petals* oblong-spathulate, scarcely shorter than the sepals, ciliate at the base. *Stamens* about 10. *Fruit* (including the spines) about the size of a cherry, 4-celled, 8-seeded.

3. **T. glabra,** *Herb. Miss.; W. & A. Prodr.* i. 75; suffruticose stem pubescent, leaves subcordate 3-lobed 7-nerved, fruit globose covered with hooked spines ciliated for nearly their whole length.

WESTERN PENINSULA; Canara, at Balticalo, *Rottler*.

Leaves 2½ by 2 in., glabrous, lobes coarsely and irregularly toothed, slightly cuspidate. *Flowers* in terminal leafless clusters. *Sepals* apiculate. *Petals* oblong, glabrous at the base. *Stamens* 30–35 (W. & A.), filaments glabrous. *Fruit* slightly hairy.—Differs from *T. semitriloba* in the number of stamens and in the larger fruit.

4. **T. rhomboidea,** *Jacq.; DC. Prodr.* i. 507; glabrous or pubescent, leaves polymorphous, fruit small globose or ovoid pubescent and with hooked spines. T. angulata, *Lam. Dict.* iii. 41; *Wight Ic.* t. 320; *W. & A. Prodr.* i. 74; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 25; *Wall. Cat.* 1075, 2, C; *Miq. Fl. Ind. Bat.* pt. i. 197. T. angulata, β. acuminata, *Wall. Cat.* 1075 β. T. Bartramia, *Roxb. Fl. Ind.* ii. 463; *Wall. Cat.* 1075, D, E. T. trilocularis, *Roxb. Fl. Ind.* ii. 462; *Wall. Cat.* 1083. T. vestita, *Wall. Cat.* 1078, *in part.*

Throughout tropical and subtropical INDIA and CEYLON, ascending to 4000 ft. in the Himalaya.—DISTRIB. Malay Islands, China, Tropical Africa.

Herbaceous or suffruticose. *Leaves* ovate rhomboid or cordate, 3–7-nerved, apex acute or somewhat 3-lobed, serrate, variable in amount and quality of pubescence. *Flowers* ¼ in., yellow, in dense cymes. *Pedicels* short. *Flower-buds* oblong, club-shaped, apiculate. *Sepals* oblong, apiculate. *Petals* oblong, ciliate at the base. *Stamens* 8–15. *Capsule* the size of a small pea, albido-tomentose between the spines, spines hooked, glabrous or ciliated.—Some of the forms of this protean species are superficially so different that they may be mistaken for distinct species. On examination, however, of large suites of specimens from various localities, it will be found that the forms merge one into the other. The same variability occurs in Tropical Africa and elsewhere—see Flora of Trop. Afr. i. 257.

5. **T. rotundifolia,** *Lam. Dict.* iii. 421; leaves suborbiculate glabrescent above tomentose beneath, flowers in interrupted racemes, fruit globose pubescent, spines conical subulate hooked pubescent. *W. & A. Prodr.* i. 75; *Roth Nov. Sp.* 222; *Wall. Cat.* p. 237, 1076 B, C, D, E; *Miq. Fl. Ind. Bat.* i. pt. 2, 196; *Dalz. & Gibs. Bomb. Fl.* 25. T. suborbiculata, *DC. Prodr.* i. 506. T. orbiculata, *Kœnig in Roxb. Hort. Beng.* 36. T. bilocularis, *Wall. Cat.* 1081.

WESTERN PENINSULA and CENTRAL INDIA, from Bandelkhand, *Edgeworth*, to Maisor, PEGU, *Wallich*.

Suffruticose, roughish. *Leaves* 1½ in., coriaceous, unequally serrate, lower serratures thickened, rugose and glabrescent above, cream-coloured and pubescent beneath; petiole ½ in. *Sepals* apiculate, albido-tomentose. *Petals* oblong, ciliate at the base. *Stamens* 15–25. *Fruit* globose, the size of a pea, pubescent, spines dilated at the base.—Possibly only a form of *T. rhomboidea*, but having larger fruits and the spines wider at the base.

6. **T. semitriloba,** *Linn.; DC. Prodr.* i. 507; herbaceous or suffrutescent, pubescent villous or glabrescent, leaves variable, fruit globose prickly, prickles hooked shaggy or ciliated scarcely dilated at the base. *Wall. Cat.* 1075, *partly.*

TENASSERIM; at Tavoy, *Gomez.*—DISTRIB. A tropical weed.

Stem hispidulous. *Leaves* cordate-ovate, sub-3-lobed, coarsely and irregularly toothed, 5–7-nerved, downy, upper leaves smaller ovate-lanceolate; petioles 2–4 in. *Flowers* in clusters along the sides of the branches. *Buds* oblong. *Sepals* apiculate. *Petals* ciliate at the base. *Stamens* 10–15. *Fruit* the size of a large pea, 4–6-valved, barbed.—A variable plant as to pubescence and form of leaf, and closely allied to *T. rhomboidea*, but differs in its larger fruit with bristly or shaggy spines.

7. **T. annua,** *Linn.; DC. Prodr.* i. 507; annual, nearly glabrous, leaves ovate acuminate toothed, fruit glabrous globose covered with long hooked spines. *Miq. Fl. Ind. Bat.* i. pt. 2, 196. T. polycarpa, *Wall. Cat.* 1079, *partly.* T. trichoclada, *Link. ex DC. Prodr.* i. 507; *Wall. Cat.* 1082. T. indica, *Lam. Dict.* iii. 420?

TROPICAL HIMALAYA, from Simla to Sikkim; the KHASIA MTS., ASSAM, CONCAN, AVA, and ANDAMAN ISLANDS.—DISTRIB. Malay Archipelago, Tropical Africa.

Stem 1–2 ft., with a line of hairs along one side, shifting at each joint. *Leaves* 4–5 by 2–4 in.; petiole long. *Stipules* subulate. *Peduncles* $\frac{1}{2}$ in., extra-axillary, 3-flowered. *Flowers* about $\frac{1}{4}$ in. *Petals* orange, nearly as long as the apiculate sepals. *Stamens* 10. *Fruit* the size of a large pea, glaucous, 4-celled; spines glabrous.

8. **T. cana,** *Blume Bijdr.* i. 116; leaves ovate-oblong or lanceolate acuminate slightly cordate unequally toothed thinly stellate-hairy above densely beneath, peduncles extra-axillary, sepals tomentose, fruit globose, spines straight ciliated.

The KHASIA MTS. and Chittagong, *Hook. & Thoms.;* Assam, Sincapore, *G. Thomson*—DISTRIB. Java, Hongkong.

Stem hispid. *Leaves* 2 by $\frac{3}{4}$ in.; petiole 1 in. *Flowers* scarcely $\frac{1}{6}$ in. *Stamens* 10–12. *Fruit* the size of a small pea; prickles hispid, with a slender transparent straight point.

** *Fruit* oblong.

9. **T. neglecta,** *W. & A. Prodr.* i. 75; annual, leaves roundish, stamens 5–10, fruit oblong indehiscent covered with hooked spines ciliated on the upper edge. *Mast. in Oliv. Flor. Trop. Afr.* i. 255. T. pentandra. *Guill. & Perr. Fl. Seneg.* i. 93, t. 19; *Ham. in Wall. Cat.* p. 237, 1075 F. T. pilosul , *Thwaites Enum.* 401.

NORTH WESTERN INDIA, *Royle;* WESTERN PENINSULA; CEYLON, at Trincomalee.—DISTRIB. Abyssinia, Senegal.

Slightly hairy, branched. *Leaves* subcordate, acuminate or slightly 3-lobed, serrate, hairy on both surfaces, especially beneath, upper lanceolate. *Flowers* small, $\frac{1}{10}$ in., in lateral extra-axillary clusters. *Sepals* linear. *Petals* oblong, obtuse, glabrous below.

Wight and Arnott, in Prodr. i. 75, describe as *T.? microphylla*, a Peninsular plant known only in a malformed condition. *Stems* herbaceous, erect, branched, glabrous; *leaves* oblong-lanceolate, not lobed, sharply serrate, glabrous; *peduncles* bearing 1–3 flowers, opposite? to the leaves; *stamens* 5–8.—It is perhaps a state of *T. pilosa* eaten down by the cattle or goats.

10. **CORCHORUS,** Linn.

Herbs or undershrubs, more or less covered with stellate pubescence. *Leaves* simple. *Peduncles* axillary or opposite to the leaves, 1–2-flowered.

Flowers small, yellow. *Sepals* 4–5. *Petals* 4–5, glandless. *Stamens* free, indefinite or rarely twice the number of the petals, springing from a short torus. *Ovary* 2–6-celled, style short, stigma cup-shaped. *Capsule* elongated, slender or subglobose, smooth or prickly, loculicidally 2–5-valved, sometimes with transverse partitions. *Seeds* numerous, albuminous, pendulous or horizontal; embryo curved.—Distrib. A genus of about 35 species, for the most part widely dispersed throughout the tropics.

* *Capsule* globose, not beaked.

1. **C. capsularis,** *L.; DC. Prodr.* i. 505; annual, capsules oblate subglobose 5-celled. *Roxb. Fl. Ind.* ii. 581; *W. & A. Prodr.* i. 73; *Wall. Cat.* 1071; 1071, B, C; *Wight Ic.* t. 311; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 25; *Miq. Fl. Ind. Bat.* i. pt. 2, 194. C. Marua, *Ham. in Wall. Cat.* 6311.—*Rumph. Amb.* v. t. 78, f. 1.

Throughout the hotter parts of India; cultivated in most tropical countries.

Leaves 2–4 by ¾–1 in., glabrescent, oblong, acuminate, coarsely toothed, base generally prolonged into tail-like appendages; petiole 1½ in. *Stipules* ¼–⅓ in. *Capsule* wrinkled, muricate, 5-valved, valves without transverse septa. *Seeds* few in each cell.—Yields the fibre known as Jute.

** *Capsule* elongated, beak entire.

2. **C. olitorius,** *L.; DC. Prodr.* i. 504; annual, capsule elongate glabrous 3–6-valved, valves with transverse partitions between the seeds, beak long erect. *Roxb. Fl. Ind.* ii. 581; *W. & A. Prodr.* i. 73; *Wall. Cat.* 1072; 1, 2, 3, 4, D, E, F; *Boiss. Fl. Orient.* i. 845; *Dalz. & Gibs. Bomb. Fl.* 25; *Miq. Fl. Ind. Bat.* i. pt. 2, 195; *Thwaites Enum.* 31. C. decemangularis, *Roxb. Fl. Ind.* ii. 582; *Wall. Cat.* p. 237, 1072 G.

Indigenous in many parts of India.—Generally distributed by cultivation in all tropical countries.

Leaves 2–4 by 1–2 in., nearly glabrous, ovate-lanceolate, 3–5-nerved, serrate, the two lower serratures prolonged into long sharp points; petiole 1–2 in., pilose. *Stipules* shorter than the petiole. *Peduncles* 1–3-flowered; shorter than the petiole. *Sepals* shortly pointed. *Petals* yellow, spathulate, longer than the sepals. *Capsule* 2 in., cylindric, 10-ribbed.—Cultivated as a potherb, or for its fibre (Jute). The plant varies in stature, hairiness, &c. Arnott (in herb.) corrects an error into which he had fallen in the measurement of the pod, in the Prodromus, and which, as corrected, should read—"pods 10–12 times longer than broad."

3. **C. trilocularis,** *L.; DC. Prodr.* i. 504; annual, capsule elongate 3-angled scabrous or aculeate, beak short erect, valves with transverse partitions. *W. & A. Prodr.* i. 72; *Roxb. Fl. Ind.* ii. 582; *Wall. Cat.* 1070 B; *Wight in Wall. Cat.* 1070 C; *Dalz. & Gibs. Bomb. Fl.* 25.

Sindh, *Stocks*; North-west Provinces, from Amballa to the Panjab; Nilghirris Mts.—Distrib. Affghanistan, Tropical Africa.

Leaves 1–4 by 1 in. elliptic-oblong or oblong-lanceolate, crenate-serrate with or without basal lobes; petiole very short, pilose. *Peduncles* 1–3-flowered, very short, opposite the leaves. *Capsule* 2–3 in., straight or curved, 3–4-angled, 3–4-valved, valves scabrous.—Of this species Wight and Arnott, l.c., make three varieties: *α*, leaves ovate oblong, capsules in pairs, 3-angled; *β*, leaves ovate-oblong, capsules solitary 4-angled; *γ*, leaves oblong-lanceolate capsules in pairs 3-angled. To the latter belongs Wallich's 1070 B. It would appear, however, that these are mere individual variations.

4. **C. urticæfolius,** *W. & A. Prodr.* i. 73; annual, capsules terete or slightly 3-angled not exceeding one inch pilose beaked, beak erect entire, valves with transverse internal partitions. *Thwaites Enum.* 31. C. olitorius,

Wall. Cat. 1072 F, *partly.* C. subscandens, *Wall. Cat.* 1074. C. æstuans, *Hb. Madr.*; *Wall. Cat.* p. 237, 1074.

Southern provinces of the WESTERN PENINSULA, *Wight;* Ava, *Wallich;* CEYLON, Trincomalee, *Thwaites.*—DISTRIB. Abyssinia.

Leaves 2–3 by 1–$1\frac{3}{4}$ in., thinly pilose, cordate, sometimes oblique, ovate acuminate, dentate (almost precisely as in *Urtica dioica*). *Peduncles* extra-axillary, 2–3-flowered. *Capsule* 1 in., bent downwards, hairy.—Closely allied to *C. trilocularis* but with a much shorter pod.

5. **C. fascicularis,** *Lam.; DC. Prodr.* i. 505; annual, capsule short subcylindric puberulous shortly beaked, valves nearly destitute of internal partitions. *Roxb. Fl. Ind.* ii. 582; *Thwaites Enum.* 401; *Dalz. & Gibs. Bomb. Fl.* 24; *Wall. Cat.* 6312. C. linearis, *Wall. Cat.* 1070, *partly.*

Throughout the hotter parts of India from BANDA, *Edgeworth,* to BENGAL, the WESTERN PENINSULA and CEYLON.—DISTRIB. Tropical Australia and Africa.

Leaves 1–2 by $\frac{1}{4}$–$\frac{1}{2}$ in., oblong lanceolate, serrated; petioles very short pilose. *Peduncles* opposite the leaves, 2–5-flowered. *Sepals* $\frac{1}{12}$ in. *Stamens* 5–10. *Capsule* $\frac{1}{2}$–$\frac{3}{4}$ in., 3 or 4 together, each 3–4-valved, valves downy.

6. **C. Antichorus,** *Ræusch. Nomencl. Bot. ed.* iii. 158; woody, perennial, much branched, branches prostrate, capsule cylindric elongate beaked. *Boiss. Fl. Orient.* i. 846; *Mast. in Oliv. Fl. Trop. Afr.* i. 263. Antichorus depressus, *Linn.; DC. Prodr.* i. 504. Corchorus humilis, *Munro Hort. Agrens. Appendix* 35; *Wight Ic.* 1073; *Dalz. & Gibs. Bomb. Fl.* 25.

North Western India from SINDH, *Stocks,* and the PUNJAB, *Vicary,* to AGRA, *Munro.* WESTERN PENINSULA, in Kattywar, Guzerat and the Deccan.—DISTRIB. Affghanistan, Aden, Tropical Africa, Cape de Verde Isles.

Branches tortuous, imbricate, 6–7 in. *Leaves* $\frac{1}{2}$–$\frac{3}{4}$ by $\frac{1}{2}$ in., shortly petioled, roundish, plicate, crenate-serrate, base 3-nerved. *Peduncles* short, stout, opposite the leaves. *Capsules* $\frac{1}{2}$–$1\frac{1}{4}$ in., straight or curved, 4-valved.

*** *Capsule* elongated, beak 3-fid spreading.

7. **C. tridens,** *L.; DC. Prodr.* i. 505; annual, capsule elongate cylindric terminated by 3 spreading points, valves without partitions. *W. & A. Prodr.* i. 73; *Thwaites Enum.* 401; *Wall. Cat.* 1073; *Boiss. Fl. Orient.* i. 845. C. Burmanni, *DC. Prodr.* i. 505. C. linearis, *Wall. Cat.* 1070. C. trilocularis, *Burm. Fl. Ind.* t. 37, f. 2.

Generally distributed.—DISTRIB. Australia and Africa.

Variable as to habit, pubescence and form of leaf. *Leaves* 1–3 by $\frac{1}{8}$–1 in., linear-oblong or lanceolate; petiole $\frac{1}{6}$–$\frac{1}{4}$ in. *Peduncles* 1–4-flowered. *Capsule* 1–2 in.—Of this species Wight and Arnott recognise three forms, viz.:—α, leaves lanceolate acuminate, Wall. Cat. 1073. β, leaves linear oblong or linear-lanceolate, *C. Burmannii* DC. *C. linearis,* Wall. Cat. 1070, C. γ, leaves oblong or obovate cuneate at the base.—The three forms merge one into the other.

8. **C. acutangulus,** *Lam.; DC. Prodr.* i. 505; annual, capsules elongate 6-angled 3 of the angles winged, beak 3-fid divisions spreading horizontally, valves with or without partitions. *W. & A. Prodr.* i. 73; *Wall. Cat.* 1069, 1074 D, E; *Wight. Ic.* t. 739; *Thwaites Enum.* 31; *Dalz. & Gibs. Bomb. Fl.* 25; *Miq. Fl. Ind. Bat.* i. pt. 2, 194. C. æstuans? *Ham. in Wall. Cat.* p. 237, 1074 C. C. fuscus, *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 582; *Ham. in Wall. Cat.* 1069.

Throughout the hotter parts of INDIA and CEYLON.—DISTRIB. Australia, Tropical Africa, West Indies.

Leaves 1–3 by $\frac{3}{4}$–1 in., more or less hairy, ovate and acute, or oblong and acuminate, serrate, with or without basal lobes; petiole $\frac{1}{6}$ in., hairy. *Stipules* linear-subulate, much shorter than the petiole. *Peduncles* opposite the leaves, 2–3-flowered. *Capsule* 1–1½ in.—Wight and Arnott describe the septa between the seeds as nearly obsolete, but they are frequently well marked.

DOUBTFUL SPECIES.

C. PUMILUS, *Ham. in Wall. Cat.* 6310 (a plant cultivated in the Calcutta Garden), is too imperfect to be determined. It is probably a depauperated form of some common species.

11. **PLAGIOPTERON,** Griff.

A climbing shrub. *Leaves* opposite and alternate, pubescent, entire. *Flowers* numerous, in peduncled panicles. *Sepals* 5. *Petals* 5, reflexed. *Stamens* numerous; filaments clavate; anthers 2-celled, cells divergent at the base. *Ovary* 3-celled; styles consolidated, subulate; ovules 2 in each cell, collateral. *Fruit* subturbinate, woody, 3-celled, 3-winged at the summit.—DISTRIB. A solitary species.

1. **P. fragrans,** *Griff. in Calc. Journ. Nat. Hist.* iv. 244, t. 13.

TENASSERIM, at MERGUI, *Griffith.*

Stellate-pubescent. *Leaves* 4 by 2 in., ovate-oblong, cuspidate; petiole ¼ in. *Flowers* small, fragrant. *Petals* 3–4 times longer than the sepals. *Stamens* longer than the petals, filaments capillary. *Ovary* pilose. *Fruit* 1½ in. diam.—Griffith, who describes this plant from specimens growing in the Calcutta Garden, says that it is supposed to come from Silhet; but I find specimens in his own Herbarium gathered by himself in Mergui, probably at a subsequent date.

12. **ECHINOCARPUS,** Blume.

Trees. *Leaves* simple, arch-veined. *Peduncles* axillary, 1-flowered, solitary or tufted. *Sepals* 4, imbricate. *Petals* 4, gashed. *Stamens* numerous, free, springing from a thick disk; anthers linear, opening by a terminal pore. *Ovary* 3–4-celled; cells many-ovuled; style subulate. *Capsule* coriaceous or woody, prickly or setose, 3–4- or by abortion, 1-celled. *Seeds* solitary few or many, pendulous, ovoid, testa bony shining, albumen fleshy; cotyledons broad, flat.—DISTRIB. One species is Australian, another Javan, the remainder are Indian.

1. **E. Murex,** *Benth. in Proc. Linn. Soc.* v. *Suppl.* ii. p. 71; leaves oblong or sublanceolate acuminate glabrous on both surfaces, spines of the fruit dilated at the base.

KHASIA MTS.; alt. 3–5000 ft., *Hk. f. & T.*

Glabrous except the peduncles. *Leaves* 3–4 by 1¾ in.; petiole 1 in. *Peduncle* 1 in. *Flowers* not seen. *Capsule* 1–1½ in., ovoid, woody, 4–5-valved, valves downy, covered with long straight subulate spines.—Kurz (Journ. As. Soc. Beng. 1870, ii. 67), identifies *E. Murex* with Blume's *E. Sigun*, but in the absence of authentic specimens of the latter I hesitate to adopt his view seeing how far apart the Khasia Mountains and Java are, and that the species has been found in no intermediate station. Clos, moreover, describes *E. Sigun* as differing both in the foliage and spines of the capsules.

2. **E. assamicus,** *Benth. l.c.* 72; leaves elliptic-oblong abruptly acuminate, glabrous above thinly pubescent beneath, spines of the fruit subulate.

UPPER ASSAM, *Griffith.*

A medium-sized tree. *Leaves* 9 by 4 in.; petiole 2–3 in. *Peduncles* puberulous. *Ovary* ovoid, bristly; style subulate. *Fruit* pendulous, 2 in. diam., globose, studded with long slender spines.

3. **E. sterculiaceus,** *Benth. loc. cit.* 72; leaves ovate or obovate cuspidate downy beneath, spines of the fruit subulate.

EASTERN HIMALAYA; Bhotan, *Griffith;* Sikkim, at 2000 ft., *Hk. f.*

A tree. *Bark* smooth. *Leaves* 8–10 by 4 in., base rounded or subcordate, minutely serrulate; petiole 2 in. *Peduncles* tomentose, 1–1½ in. *Fruit* globose, densely covered with very long subulate spines.

4. **E. tomentosus,** *Benth. loc. cit.* 72; leaves elliptic tomentose beneath, capsule covered with short bristles.

EASTERN HIMALAYA; Bhotan, *Griffith;* Sikkim, alt. 2-4000 ft., *Hk. f.*

A lofty tree, younger portions tomentose. *Leaves* 6–8 by 3–4 in., coriaceous, acuminate, serrated, base rounded; petiole 1¾ in., downy, thickened at the apex. *Peduncles* 1½–2 in., tomentose, thickened at the apex. *Flowers* ½ in. diam. *Sepals* 5, ovate, pointed. *Petals* oblong, concave, 4–5-toothed at the apex. *Anthers* linear, apiculate, filaments pilose. *Capsule* 1½ in., ovoid, woody, 4–5-valved, valves densely covered with short fine bristles.

5. **E. dasycarpus,** *Benth. loc. cit.* 72; leaves oblong or oblanceolate entire or serrulate glabrous on both surfaces, petals longer than the calyx, fruit covered with short dense ultimately deciduous spines.

EASTERN HIMALAYA; Bhotan, *Griffith;* Sikkim, alt. 4–6000 ft., *Hk. f.*

A tree. *Leaves* 4–5 by 3 in., coriaceous, shortly acuminate, base tapering; petiole 1 in., thickened at the apex. *Peduncles* 1½–2 in., axillary or aggregated at the end of the branches. *Flowers* nearly 1 in. diam. *Receptacle* cushion-shaped, pitted. *Sepals* oval or orbicular. *Petals* broad, lobed. *Anthers* oblong, apiculate. *Ovary* 4-celled, style longer than the ovary. *Capsule* 1 in., subglobose, 4–5-valved, valves woody. *Seeds* ½ by ¾ in., oval, black, smooth.—Variable in foliage and size of flower.

13. ELÆOCARPUS, Linn.

Trees. *Leaves* simple. *Flowers* usually hermaphrodite, rarely polygamous, in axillary racemes. *Sepals* 5, distinct. *Petals* 5, usually laciniate at the apex, rarely entire, springing from the outside of a cushion-shaped, often 5-lobed torus. *Stamens* usually indefinite, never less than 10, arising from the inside of the torus, and more or less aggregated into groups opposite the petals and alternating with the glands of the torus; anthers innate, linear, opening by a terminal pore. *Ovary* sessile, 2–5-celled, cells 2–many-ovuled; style columnar. *Drupe* with a single bony stone which is 3–5 or by abortion 1-celled. *Seeds* pendulous, 1 in each cell, albumen fleshy; cotyledons flat.—DISTRIB. About 50 species, most abundant in the hotter parts of India and the Indian archipelago. A few species are found in some of the South Sea islands, New Zealand, and Australia.

SECT. I. **Ganitrus.** *Ovary* and *drupe* 5-celled.

1. **E. Ganitrus,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 592; leaves glabrescent elliptic acute, stamens many anthers bearded, drupe globose. *Wall. Cat.* 2660 A *to* D; *Dalz. & Gibs. Bomb. Fl.* 27. Ganitrus sphærica, *Gærtn. Fruct.* ii. 271, t. 139; *Wight Ic.* i. 66.—*Rumph. Amb.* iii. t. 101.

Native of various parts of India, *Roxburgh;* NIPAL, and CHITTAGONG, *Wallich;* MALACCA, CONCAN, on the higher Ghats, *Dalz. & Gibs.*—DISTRIB. Malay Archipelago, *Roxburgh.*

A tree. *Leaves* 5–6 by 2 in., serrulate; petiole ½–¾ in. *Stipules* minute, subulate, caducous. *Racemes* from the old wood, drooping, shorter than the leaves. *Flower-buds* ovoid-conical, elongate. *Flowers* ½ in. diam., white. *Sepals* lanceolate, acuminate, glabrescent, internally 1-ribbed. *Petals* glabrescent, oblong, laciniate halfway down. *Stamens* 35–40. *Ovary* spherical, albido-pilose; style longer than the stamens. *Drupe* the size of a cherry, globose, purple; stone tubercled, grooved, 5-celled, 5-seeded.

2. **E. parvifolius,** *Wall. Cat.* 684 *and* 2662 A, B; leaves glabrous elliptic acute at both ends minutely serrulate, stamens 15–20, anthers beardless, drupe oblong. *C. Mull. Anot. de fam. Elæocarp.* 24.

Malacca, Mt. Ophir, *Griffith,* &c.; Penang, *Jack;* Sincapore.—Distrib. Borneo.

A small tree. *Young shoots* silky. *Leaves* 3–3½ by 1 in.; petiole ½–¾ in. *Pedicels* and calyx villosulous. *Flowers* about ⅙ in. diam. *Glands* large, 2-lobed, opposite the sepals. *Stamens* in pairs between each gland, opposite the petals, and singly opposite the glands and sepals. *Ovary* 5-celled, cells opposite the petals. *Drupe* ¾ in. and upwards, olive-shaped; stone 5-celled.—In one of Wallich's specimens the drupe is globose.

3. **E. nitidus,** *Jack Mal. Misc.; ex Hook. Bot. Misc.* ii. 84; leaves ovate-lanceolate serrate, stamens 15, anthers beardless, drupe globose. *Miq. Fl. Ind. Bat.* i. pt. 2, 208; *Wall. Cat.* 2670.

Malacca and Penang, *Jack,* &c.—Distrib. Java.

A tree. *Leaves* 4–6 by 2–2½ in., base tapering; glabrous, petiole 1–¾ in. *Flowers* ⅓ in. diam. *Sepals* linear, acute, thinly pilose. *Stamens* 15, 10 in pairs between the glands. *Drupe* globose; stone rugose, 5-celled, one cell only usually fertile.—Like *E. robustus,* but differing in the anthers and fruit.

Sect. II. **Dicera.** *Flowers* bisexual. *Anthers* not, or scarcely prolonged at the apex (*see also* E. prunifolius *and* E. pedunculatus). *Drupe* 1–3-celled.

* *Anthers usually bearded, sometimes not* (*see* E. robustus *and* E. lanceæfolius).

4. **E. serratus,** *L.; W. & A. Prodr.* i. 82, *not of Roxb.;* leaves elliptic obtuse or acuminate crenate-serrate, stamens 20–35, anther-valves sparingly bearded, drupe oblong, stone tubercled 1-celled 1-seeded. *Wall. Cat.* 2666 B, F, K, L; *Thwaites Enum.* 32; *Miq. Fl. Ind. Bat.* i. pt. 2, 208. E. Pirincara, *Wall. Cat.* 2664 *partly, not of DC.* E. integrifolius, *Lam. Ill.* t. 459; *DC. Prodr.* i. 519. ? E. lacunosus, *Wall. Cat.* 6858, 9026.

Tropical Himalaya; Sikkim, 2–3000 ft., *Hk. f.*, Nipal, *Wallich;* Eastern Bengal, and the Eastern and Western Peninsulas.—Distrib. Java.

A tree. *Leaves* 4–5 by 2½ in., glabrous, base tapering; petiole 1½ in. *Racemes* scarcely so long as the leaves, ascending. *Flower-buds* ovoid-conical. *Flowers* ½ in. diam. *Sepals* ovate, speckled, glabrous. *Petals* laciniate halfway down, ciliate at the edges. *Ovary* villous, 3-celled. *Drupe* the size and form of a small olive, edible; stone oblong, pointed, tubercled, pitted, 1-celled.—In Lamarck's *integrifolius* the leaves are nearly entire. The plant called *E. serratus* in Roxburgh's unpublished drawings apparently belongs to this species, having a 1-celled stone, while the species so called in Roxburgh's Fl. Ind. ii. 596, is described as 3-celled. I have referred *E. lacunosus,* Wall., both to this species and to *E. cuneatus* with doubt. The specimens have leaves and fruit only, and are insufficient to determine to which species (if either) they really belong.

5. **E. floribundus,** *Blume Bijdr.* 120; leaves elliptic-oblong acuminate crenate-serrate base acute, peduncles spreading, stamens about 20, anthers bearded, drupe ovoid 1-celled 1-seeded. *Miq. Fl. Ind. Bat.* i. pt. 2, 210. E. grossa, *Wall. Cat.* 2661. E. serratus, *Roxb. ex Wall. Cat.* 2666 A, B, *partly.* E. oblongus, *Wall. Cat* 2677; *C. Müll. Anot. de fam. Elæocarp.* 19, f. 30. E. Lobbianus, *Turcz. in Mosc. Bull.* 1858, 235.

Eastern Bengal; Khasia Mts., alt. 3–4000 ft., and Chittagong; Assam, *Griffith;* Tenasserim, *Helfer;* Sincapore; Birma, *Kurz.*—Distrib. Java.

A tree. *Leaves* 4 by 2½ in. and upwards, coriaceous, glabrous, acute at both ends, venation obscure ; petiole 1¾ in., thickened at the top. *Flower* ⅓ in. diam. *Pedicels* pilose. *Sepals* deltoid-lanceolate. *Petals* cuneate, cut halfway down, lobes fringed. *Ovary* 3-celled. *Stone* pitted.

6. **E. robustus,** *Roxb. Hort. Beng.* 42 ; *Fl. Ind.* ii. 597 ; leaves ovate-oblong acuminate serrate, flower-buds oblong-ovoid, stamens 50, anthers bearded rarely beardless, drupe ovoid 3-celled 1-seeded. *Wight Ic.* t. 64 ; ? *Wall. Cat.* 2664 A. E. ovalifolius, *Wall. Cat.* 2665 ; *C. Müll. Anot. de fam. Elæocarp.* 21 E. amygdalinus, *Wall. Cat.* 6857. E. serratus, *Wall. Cat.* 2666 C. E. oblonga, *Wall. Cat.* 2677 ? (specimen imperfect). E. aristatus, *Wall. Cat.* 2665 B. ? *Wall. Cat.* 9027 (a monstrous form, not in flower).

From the Eastern Himalaya, Sikkim, alt. 2000 ft., and the Khasia Mts. to Chittagong, Tenasserim, Malacca and Penang ; also in Canara and Ceylon.

A tree or shrub ? Young shoots pubescent. *Leaves* 6–8 by 2½–3 in. and upwards, glabrous ; petiole 1–2 in. *Racemes* shorter than the leaves. *Flower-buds* acute. *Flowers* ½ in. diam. *Anthers* puberulous. *Ovary* downy. *Drupe* 1–1½ in., rind hard crustaceous, yellow ; stone furrowed deeply pitted.

7. **E. cuneatus,** *Wight Ill.* i. p. 83 ; leaves cuneate-obovate acuminate, stamens 30–40, anthers bearded, ovary 3-celled, drupe olive-shaped, stone 3-celled. ? E. serratus, *Roxb. Hort. Beng.* 42 ; *Fl. Ind.* ii. 296 ; *Miq. in Herb. Hohenack.* ; *Thwaites Enum.* 32. ? E. lacunosus, *Wall. Cat.* 6858, 9026.

Eastern Himalaya ; Sikkim ; Chittagong ; Silhet ; Birma and Tenasserim ; Western Peninsula, the Southern Provinces, *Wight, Beddome ;* Ceylon, *Thwaites.*

A small tree. *Leaves* 3 by 1½ in., glabrous, serrulate, petiole ½–¾ in. *Racemes* shorter than the leaves. *Buds* conical. *Petals* speckled (in dried specimens), glabrous, ciliolate. *Anthers* usually bearded or not, on the same specimen. *Drupe* the size and form of an olive ; stone rugose, pitted, 3-celled.—The synonymy of this species is open to doubt.

8. **E. lanceæfolius,** *Roxb. Hort. Beng.* 42 ; *Fl. Ind.* ii. 598 ; leaves broad lanceolate serrulate, flower-buds ovate-lanceolate, stamens 15, drupe oblong-ovoid 1-celled. *Wight Ic.* i. 65. E. lanceolata, *Wall. Cat.* 2667, *partly.*

Eastern Himalaya, Sikkim, alt. 5–6000 ft. : Bhotan, *Griffith ;* Khasia Mts., alt. 4–5000 ft., Silhet and Tenasserim, *Wallich, Griffith,* &c. ; Canara, *Law.*—Distrib. Java.

A tree. *Leaves* 4–6 by 1¾–2 in., glabrous, base tapering ; petiole ½–1 in. *Racemes* nearly as long as the leaves ; pedicels slender. *Flowers* about ½ in. diam. *Sepals* glabrous, lanceolate. *Petals* ciliate at the edges, shorter than the sepals. *Anthers* sparingly or not at all bearded. *Ovary* 3-celled, downy. *Drupe* the size of a pigeon's egg.

9. **E. Helferi,** *Kurz ms. ;* leaves oblong-lanceolate crenate-serrate, flower-buds ovoid obtuse, anthers bearded.

Tenasserim, *Helfer ;* Andamans, *Kurz.*

A tree. *Leaves* 8–10 by 3 in., glabrous, base rounded ; petiole 1–1½ in. *Raceme* half the length of the leaves. *Flowers* ½ in. diam. *Sepals* ovate-lanceolate, downy. *Petals* wedge-shaped, laciniate halfway down, ciliate at the edges. *Ovary* globose, downy, 3-celled.—Apparently very nearly allied to *E. robustus* from which it differs in the shorter petioles, smaller flowers and more broadly ovoid buds.

10. **E. sikkimensis,** *Mast. ;* leaves elliptic acuminate crenate-serrate, serratures mucronulate, flower-buds ovate-lanceolate, anthers bearded, drupe ellipsoid.

Eastern Himalaya ; Sikkim, alt. 5000 ft., *Hk. f. ;* Assam, *Griffith.*

A tree. *Leaves* 8 by 3 in., glabrous ; petiole 2 in. thickened at the apex. *Racemes* erect, half the length of the leaves ; pedicels thinly pilose. *Flowers* about ½ in. diam. *Sepals* lanceolate, pilose. *Petals* cuneate, slightly silky at the back. *Disk* villous.

Ovary 3-celled. *Drupe* 2 by 1 in., tubercled.—Differs from *E. robustus* in the narrow pointed flower-buds. It is open to doubt whether the fruit placed with it in the Kew Herb. belongs to this species.

** *Anthers usually beardless.*

11. **E. leptostachya,** *Wall. Cat.* 2672; leaves glabrous lanceolate serrulate, peduncles erect, pedicels pilose, flower-buds rounded, anthers beardless. *C. Müll. Anot. de fam. Elæocarp.* 23.

Tenasserim, *Helfer;* Penang, *Wallich.*

A tree. *Leaves* 6–8 by 2–3 in., serrulate, base rounded; petiole 2–2½ in., thickened at the apex. *Peduncles* half the length of the leaves. *Flowers* ⅓ in. diam. *Sepals* pubescent. *Petals* cuneate, ciliate, tip laciniate. *Ovary* villous, 3-celled.—Very like *E. robustus*, but the anthers are not bearded.

12. **E. lucidus,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 600; leaves glabrous lanceolate serrate, racemes as long as the leaves, flower-buds ovoid-conical, anthers beardless.

Chittagong; *Roxburgh, Griffith.*

A tree. *Leaves* 5 by 2 in., acute, serratures spiny, base rounded; petiole 1 in. *Raceme* erect, many-flowered, scarcely so long as the leaves. *Flowers* ¾ in. diam. *Sepals* lanceolate. *Petals* laciniate halfway down. *Anthers* puberulous. *Disk* villous. *Fruit* not seen.—Differs from *E. robustus* in the beardless anthers as well as in the pointed buds and smaller flowers.

13. **E. oblongus,** *Gærtn.; W. & A. Prodr.* 82; leaves glabrous elliptic acute or acuminate serrate, stamens 30–40, anther-valves beardless or bearded, drupe oblong, stone 1-celled 1-seeded. *Smith in Rees Cycl.; DC. Prodr.* i. 519; *Wight Ic.* t. 46; *Dalz. & Gibs. Bomb. Fl.* 27; *Miq. Fl. Ind. Bat.* i. pt. 2, 208. E. glandulosus, *Wall. Cat.* 6859; E. adenophyllus, *Wall. Cat.* 6860. E. Perim-Kara, *DC. Prodr.* i. 509; *Wall. Cat.* 2664 B, *in part.* E. serratus, *Heyne in Wall. Cat.* 2666. ? E. angustifolius, *Wight Ill.* p. 84.

Tenasserim, at Moulmein, *Lobb;* Western Peninsula, from the Concan to Travancor.—Distrib. Moluccas, Borneo.

A tree. *Leaves* 3–4 by 1¾–2 in., base wedge-shaped; petiole ¾–1 in., glandular at the apex. *Racemes* from the axils of the fallen leaves. *Flower-buds* ovoid-conical. *Petals* ciliolate. *Drupe* 1 in.—Wight and Arnott make two vars. of this species—one var., α, with acute leaves and stout pedicels, the other var. β, with marked acuminate leaves and slender pedicels; the former has also larger flowers and more lanceolate sepals, the latter has smaller flowers and ovate acute sepals; but the two forms seem to merge one into the other. The saccate glands seen on the under surface of the leaves in this and other species are possibly the result of insect agency.

14. **E. polystachyus,** *Wall. Cat.* 2671; leaves elliptic-oblong serrulate pubescent beneath, flower-buds subglobose, petals almost entire at the apex, stamens 40–50, anthers beardless, drupe 1-celled.—*C. Müll. Anot. de fam. Elæocarp.* 20, f. 13.

Sincapore, *Wallich;* Malacca, *Maingay.*

A tree; shoots, petioles, peduncles, pedicels and sepals pubescent. *Leaves* 4–8 by 3–4 in., base rounded; petiole 2½ in., thickened at the apex. *Peduncles* scarcely exceeding the petioles, pedicels resupinate. *Flowers* ⅓ in. diam. *Petals* oblong. *Stamens* numerous. *Glands of disk* obsolete. *Ovary* 2-celled. *Drupe* ⅔ in., glabrous, crustaceous.

15. **E. glabrescens,** *Mast.;* leaves at first covered with ferruginous down afterwards glabrescent lanceolate-acuminate, stamens 15–20, anthers beardless, drupe globose 1-celled.

Malacca, *Maingay.*

A tree; herbaceous portions downy. *Leaves* 3 by 1½ in., acute at both ends, glabrescent, or with a few hairs beneath; petiole 1½ in., with two glands at the apex. *Peduncle* as long or longer than the petiole, pedicels ⅛ in., hairy. *Flowers* ⅓ in. diam. *Sepals* ovate-lanceolate. *Petals* oblong. *Anthers* puberulous. *Ovary* 3-celled. *Drupe* the size of a cherry; stone 1-celled, 1-seeded.

16. **E. stipularis,** *Blume Bijdr.* 121; leaves elliptic-oblong acuminate serrulate pubescent beneath, stipules ovate incised, drupe globose 1-celled.

From Birma, *Wallich,* to Malacca, *Maingay.*—Distrib. Java, Borneo.

A tree, herbaceous portions pubescent. *Leaves* 6 by 2 in.; petiole 1 in. *Racemes* nearly as long as the leaves, pubescent. *Flowers* ½ in. diam. *Buds* ovoid. *Sepals* lanceolate, silky-pubescent. *Disk* 5-lobed. *Anthers* bearded or beardless, 15–20. *Ovary* downy, 5 celled.

17. **E. amœnus,** *Thwaites Enum.* 32; leaves glabrous lanceolate acuminate serrate, serratures aristulate, anthers beardless, drupe globose 1-celled. *Beddome Flor. Sylvat.* t. 111.

Southern provinces of the Western Peninsula, *Beddome;* Ceylon, Central province, alt. 4000 ft., *Thwaites.*

A tree. *Leaves* 2–4 by ¾–2 in., glandular beneath; petiole ⅓–⅔ in. *Leaf-buds* pilose. *Racemes* from the axils of the fallen leaves. *Flower-buds* ovate-lanceolate. *Sepals* lanceolate. *Ovary* 5-celled. *Drupe* the size of a large cherry; stone 1-celled.

18. **E. obovatus,** *Arn. in Act. Acad. Nat. Cur.* xviii. 323 (1836); leaves glabrous obovate, racemes longer than the leaves, anthers beardless, drupe globose 1-celled. *Thwaites Enum.* 32. E. coriaceus, *Hook. Ic. Pl.* t. 154; *Wight Ill.* i. 83 (1840).

Ceylon, Newera Ellia, alt. 6–8000 ft.

A shrub. *Leaves* 2½–3 by 1½–2 in., coriaceous, obtuse, serrulate, sometimes glandular, base cuneate; petiole ½ in. *Flowers* ¾ in. diam., drooping. *Sepals* lanceolate, tomentose. *Stamens* 15–25. *Ovary* minutely villous, 3-celled. *Drupe* spherical; stone rugulose, tubercled.

19. **E. montanus,** *Thwaites Enum.* 32; leaves ovate-oblong or orbicular obtuse denticulate glandular beneath, anthers beardless, drupes spherical.

Ceylon; loftier parts of the island, alt. 6–8000 ft., *Thwaites.*

A middle-sized tree. *Leaves* 2–3½ by 1¾–2 in., coriaceous, younger ones pubescent beneath; petiole ½–1 in. *Racemes* nearly as long as the leaves, pubescent. *Flowers* ⅓ in. diam. *Sepals* oblong. *Petals* silky, longer than the sepals.

20. **E. subvillosus,** *Arn. in Act. Acad. Nat. Cur.* xviii. 323 (1836); leaves oval obtuse abruptly and shortly acuminate crenate-serrate glabrescent, bracts pectinate, anthers pubescent. drupe oblong 1-celled.—*Thwaites Enum.* 33. E. pubescens, *Hook. Ic. Pl.* 155, (1837).

Ceylon; Saffragam district, *Thwaites;* Malacca, *Maingay.*—Distrib. Borneo.

Arborescent; herbaceous portions densely pubescent, at length glabrescent. *Leaves* 4 by 2½ in.; petiole 1½ in. *Stipules* subulate. *Racemes* downy, from the axils of the fallen leaves. *Flower-buds* ovate, acute. *Petals* oblong, clawed, fimbriate at the apex. *Stamens* 15–25. *Anthers* densely pubescent. *Ovary* villous. *Drupe* olive-shaped; stone tubercled, sharply pointed.

Sect. III. **Monocera,** *Jack* (Gen.). *Flowers* bisexual. *Anthers* terminated by a long awn. *Ovary* 2–3- rarely 5-celled. *Drupe* 1-celled, 1–2-seeded.

* *Petals narrowed toward the base, dilated toward the apex.*

† Anther-tails erect.

21. **E. tuberculatus,** *Roxb. Fl. Ind.* ii. 594; leaves glabrous above hairy along the nerves beneath obovate minutely serrate base cuneate,

stamens 70–80, anther-tails erect. *Wall. Cat.* 2658 B, C; *Beddome Fl. Sylvat.* t. 113. E. serrulatus, *Roxb. Hort. Beng.* 42. E. rugosus, *Wall. Cat.* 2658, A, B, *not of Roxb.* Monocera tuberculata, *W. & A. Prodr.* i. 83; *Wight Ic.* 62; *Wight. Ill.* t. 35; *Dalz. & Gibs. Bomb. Fl.* 27. M. subintegerrima, *Miq. in Herb. Hohenack.*

PEGU and MARTABAN, *Wallich;* Southern provinces of the WESTERN PENINSULA, *Wight*, &c.—DISTRIB. Java.

A tree. *Leaves* 6–12 by 3–4 in., glabrous or more or less downy beneath; petiole 1½–2in., pilose or glabrescent, thickened at the apex. *Racemes* erect, more than twice the length of the petiole. *Pedicels* recurved, ultimately erect. *Flower-buds* lanceolate. *Flower* 1 in. diam. *Sepals* lanceolate, rusty-pubescent. *Petals* oblong-cuneate, deeply laciniate, sometimes bifid, silky on the outside. *Stamens* very numerous (70), filaments hairy or glabrous. *Ovary* 2-celled, cells 8-ovuled. *Drupe* 1½–2 in., oval, smooth; stone 1–2-celled, coarsely tubercled furrowed.—To this species may possibly be referred *E. grandifolius*, Kurz, Journ. As. Soc. Beng. 1872, pt. ii. p. 294, of which leaves only exist in the Kew Herbarium. The leaves are larger than ordinary. The nuts of *E. tuberculatus* are worn by the Hindoos as a religious ornament.

22. **E. aristatus,** *Roxb. Hort. Beng.* 52; *Fl. Ind.* ii. 599; leaves glabrous cuneate-obovate, stamens 40–50, anther-tails erect. Monocera Roxburghii, *Wight Ic.* i. 63. Elæocarpus rugosus, *Wall. Cat.* 2659 A, *partly, not of Roxb.*

BHOTAN, *Booth;* SILHET, *Wallich;* ASSAM, *Jenkins;* CONCAN, *Stocks.*

A tree. *Leaves* 6–10 by 3 in., serrate, base tapering; petiole 1 in. *Racemes* nearly as long as the leaves. *Flower-buds* lanceolate, ribbed. *Sepals* lanceolate, pubescent. *Petals* wedge-shaped, deeply fringed. *Filaments* glabrous. *Ovary* villous, 2-celled, cells 10–12-ovuled. "*Drupe* the size shape and colour of a large olive; stone oblong, pointed at both ends, rugose."—*Roxb.*

23. **E. rugosus,** *Roxb. Hort. Beng.* 42; *Fl. Ind.* ii. 596; leaves glabrescent shortly petioled or subsessile obovate-oblong serrate, peduncles downy, stamens 30, anther-tails erect, drupe yellow obovoid 1–2-celled, stone 2-edged tubercled. *Wight Ic.* t. 61.

CHITTAGONG, *Roxburgh;* WESTERN PENINSULA, Coorg, Nilghiri Mts., *Wight, Gardner.*

A tree. *Leaves* 6–12 by 4 in. *Racemes* shorter than the leaves, spreading. *Flowers* 1 in. diam. *Flower-buds* elongate, conical. *Sepals* linear-lanceolate. *Petals* cuneate, silky, deeply laciniate. *Ovary* villous 2-celled, cells 8-ovuled. *Stone* oblong, pointed at both ends.—The flowers are generally smaller than those of *E. aristatus.*

24. **E. Monocera,** *Cav. Ic.* t. 501; leaves glabrous cuneate-obovate serrulate serratures apiculate, stamens 40–50, anther-tails erect very long. E. obtusus, *Blume Bijdr.* 123. ? E. venustus, *Beddome Fl. Sylvat.* t. 174. Monocera macrocera, *Zoll. ex Walp. Ann.* i. 112.

ASSAM, *Griffith;* ? BIRMA, *Kurz;* MALACCA, *Griffith;* ? Southern provinces of the WESTERN PENINSULA, *Beddome.*—DISTRIB. Borneo, Sumatra, Philippines.

A tree. *Leaves* 3–5 by 1½–2 in., obtuse, acute or acuminate, often glandular beneath; petiole 1–1½ in. *Racemes* shorter than the leaves, 3–7-flowered. *Flower-buds* ovoid, acute. *Sepals* lanceolate. *Petals* cuneate, lobed, pilose. *Disk* 10-lobed. *Ovary* pubescent, 2-celled. *Drupe* 1½ in., ovoid; stone tubercled, 1-celled.—Beddome's *E venustus*, Fl. Sylvat. t. 174, so closely resembles *E. Monocera*, that it may perhaps be considered as a variety of that species. It differs, however, especially in the ovate leaves having shorter petioles, glabrous sepals, and very short anther-tails.

25. **E. punctatus,** *Wall. Cat.* 2676; leaves small glabrous above densely felted beneath oval acute entire, anther-tails long erect, drupe ovoid.

Singapore, *Wallich.*

A tree. *Leaves* 2 by 1 in., with brownish pubescence beneath; petiole ⅙ in. *Flower* ½ in. diam. *Sepals* lanceolate. *Petals* oblong, silky. *Drupe* 1½ in., scaly.

I have seen only imperfect specimens of this, and have some doubt whether the foliage in Herb. Wallich. does not belong to some other genus (? *Pterospermum*).

26. **E. acuminatus,** *Wall. Cat.* 2675; leaves glabrous lanceolate acuminate serrulate, racemes erect half the length of the leaves, flower buds fusiform lanceolate, stamens numerous, anther-tails short.

Eastern Bengal; Assam, Silhet, and the Khasia, *Wallich,* &c.

A tree. *Leaves* 6 by 1¾ in.; petiole ¾–1 in., lower ones much longer, thickened at the apex. *Flowers* ½ in. diam. *Sepals* oblong-lanceolate, slightly villous. *Petals* silky outside, laciniate at the apex. *Disk* broad, lobed. *Ovary* subglabrous, 2–3-celled; ovules numerous.

27. **E. ferrugineus,** *Wight Ic.* 205 (Monocera), *not of Jack;* leaves oblong-oval entire downy beneath, stamens 20, anthers shortly awned, ovary 3-celled.—*Beddome Flor. Sylv.* t. 112.

Western Peninsula, Nilghiri, Pulney, &c. Mts., *Munro,* &c.

A tree. Young branches stout, covered with rusty down. *Leaves* 3–6 by 1¾–2 in., coriaceous, convex above; petiole 1–2 in., villous, thickened at the apex. *Racemes* downy, shorter than the leaves, crowded at the ends of the branches. *Flowers* ¾ in. diam. *Sepals* lanceolate, downy. *Petals* silky, oblong, laciniate at the apex. *Drupe* ¾ in., ovoid; stone 1-celled, 1-seeded.—The leaves are remarkably convex in all the specimens. This differs from Jack's *Monocera ferruginea* (Hook. Bot. Misc. ii. 86), in the short petiole, and other characters.

28. **E. cyanocarpa,** *Maingay mss.;* leaves glabrous lanceolate serrulate shortly petioled, racemes nearly as long as the leaves, buds elliptic-lanceolate, ovary 5-celled, drupe 3-celled.

Malacca, *Maingay.*

A tree. *Leaves* 5–6 by 1–¾ in.; petiole ½ in. *Flowers* nearly ½ in. diam. *Sepals* lanceolate. *Petals* obovate, longer than the sepals, divided halfway down into linear-lanceolate very acute straight segments. *Anthers* puberulous. *Ovary* villous; style much exceeding the stamens. *Drupe* the size of a large cherry, bright blue; stone rugose, woody, 3-celled.

29. **E. bracteatus,** *Kurz in Flora* 1871, p. 278; glabrous, leaves obovate-oblong, bracts leafy dentate, stamens numerous, ovary villous, stone rugose.

Martaban, *Kurz.*

A large tree. *Leaves* 5–6 in., pointed at both ends, repando-dentate; petiole ½–1 in. *Racemes* axillary. *Pedicels* 1 in., glabrous; bracts ⅓–1 in., obovate, apparently persistent. *Sepals* ½ in., linear-lanceolate, silky outside, ciliate. *Petals* cuneate-oblong, bifid, lobes laciniate. *Drupe* the size of a plum.

30. **E. ceylanicus,** *Arn. in Act. Acad. Nat. Cur.* xviii. 323; leaves glabrous long petioled broadly ovate acuminate, stamens numerous, anther-tails erect. Monocera Walkerii, *Wight Ill.* i. 84; *Thwaites Enum.* 33.

Ceylon; Saffragam District, alt. 5000 ft., *Walker,* &c.

A tree. *Leaves* 4–6 by 2 in., crenulate; petiole 1–1½ in. *Racemes* as long as the leaves; pedicels slender, 1½ in. *Flower-buds* lanceolate. *Flowers* secund, drooping. *Sepals* lanceolate. *Petals* densely hairy, sparingly fimbriate. *Filaments* pubescent. *Ovary* 2-celled; stone tubercled, subcylindric.

31. **E. glandulifer,** *Mast.;* leaves glabrous long-petioled ovate-lanceolate undulate crenate, stamens numerous, anthers hairy, ovary

3-celled. Monocera glandulifera, *Hook. ex Wight Ill.* i. p. 84. *Thwaites Enum.* 33.

CEYLON; Central Provinces, 4–6000 ft., *Gardner*, &c.

A tree. *Leaves* 4–5 by 2 in., glandular beneath; petiole 1¾ in. *Racemes* shorter than the leaves, many-flowered. *Flower-buds* ovoid. *Flowers* ⅜ in. diam., drooping. *Petals* oblong, pubescent. *Ovary* silky, 3-celled. *Drupe* olive-shaped; stone 2-celled. —Nearly allied to *E. prunifolius* and *E. Munroii*. The so-called saccate glands on the under surface of the leaf are possibly the result of insect agency.

†† Anther-tails at length reflexed.

32. **E. Munroii,** *Mast.;* leaves glabrous long-petioled ovate-lanceolate acuminate, stamens 20, anther-tails at length reflexed, drupe olive-like. Monocera Munroii, *Wight Ill.* p. 84; *Ic.* t. 952.

WESTERN PENINSULA; Nilghiri Mts., *Wight;* Concan, *Stocks.*

A tree. *Branches* with prominent scars. *Leaves* 3 by 2 in., crenulate; petiole 2 in. *Racemes* many-flowered, scarcely as long as the leaves. *Flower-buds* ovoid. *Flowers* ½ in. and upwards diam., drooping. *Sepals* lanceolate, acute. *Anthers* glabrous. *Ovary* 2-celled, on a raised torus. *Drupe* yellowish, shining, edible; stone 1-celled.

33. **E. apiculatus,** *Mast.;* leaves glabrous obovate acuminate minutely serrulate base cuneate, racemes half the length of the leaves, anther-tails reflexed, disk very small glabrescent, drupe oblong apiculate 2-celled.

MALACCA, *Maingay.*

A tree, 50–60 ft. *Stem* very thick. *Leaves* 6 by 2½ in. and upwards; petiole ½ in., thickened at both ends. *Peduncles* puberulous, many-flowered; pedicels about ½ in., articulate at the base, dilated at the apex. *Flower* ⅝ in. diam. *Buds* oblong, obtuse. *Sepals* linear-oblong, puberulous. *Petals* white, cuneate, 2-lobed, lobes fringed silky. *Stamens* numerous. *Drupe* 1 in., resembling the fruit of a *Diospyros.*

** *Petals wide at the base, narrowed towards the apex.*

34. **E. prunifolius,** *Wall. Cat.* 2669; leaves glabrous lanceolate long-petioled, petals nearly entire, stamens 20, anther-tails obsolete or short. *C. Müll. Anot. de fam. Elæocarp.* 15.

SILHET, *Wallich;* KHASIA MTS., alt. 1–3000 ft., *Griffith*, &c.

A tree. *Leaves* 3–5 by 1–1½ in., often recurved; petiole 2 in. *Racemes* nearly as long as the leaves, loose; pedicels glabrous. *Flower buds* ovoid. *Sepals* lanceolate. *Petals* deltoid, nearly entire, silky on both sides. *Anthers* glabrous. *Ovary* villous, 2–3-celled, cells 6-ovuled. *Drupe* ⅜–¾ in., ovoid, 1-celled, 1-seeded.

35. **E. paniculatus,** *Wall. Cat.* 2663; leaves glabrous elliptic acuminate entire, petals nearly entire silky, stamens 50, anthers and ovary villous. *C. Müll. Anot. de fam. Elæocarp.* 12. Monoceras leucobotryum, *Miq. Fl. Ind. Bat. Suppl.* i. 409; Monocera Griffithii, *C. Müll. l.c.*

MALACCA, *Maingay;* SINGAPORE, *Wallich.*—DISTRIB. Banka.

A tree. *Leaves* 6 by 2 in. and upwards, coriaceous, base rounded; petiole 2–3 in., thickened at the apex. *Racemes* subterminal, erect, nearly as long as the leaves. *Flower-buds* ovoid, acuminate. *Flowers* ½ in. diam. *Sepals* lanceolate, hoary, silky outside. *Anther-tails* reflexed. *Drupe* ½ in., ovoid; stone tubercled.

36. **E. Varunua,** *Ham. in Wall. Cat.* 2666 G, H; leaves glabrous elliptic acuminate serrulate, flower-buds ovate-lanceolate, anthers puberulous, ovary villous. ? E. Finlaysonianus, *Wall. Cat.* 6851.

TROPICAL HIMALAYA, from Kumaon to Sikkim, alt. 1–2000 ft. ASSAM; SILHET, CHITTAGONG, and MALACCA.

A tree. *Leaves* 3–7 by 1¾–3 in., base rounded; petiole 1½–3 in. *Racemes* axillary, half the length of the leaves and upwards. *Flower* ½ in. diam. *Sepals* ovate-lanceolate, white, silky. *Petals* oblong fimbriate, downy outside.—The *E. Finlaysonianus* doubtfully referred to here is a native of Siam.

37. **E. pedunculatus,** *Wall. Cat.* 2678 ; glabrous, leaves long-petioled oblong obtuse serrulate with apiculate serratures, racemes much shorter than the leaves, buds ovate-lanceolate, stamens few, anthers glabrous tails very short, ovary 2-celled glabrous.

MALACCA, *Maingay;* SINCAPORE, *Wallich.*

A tree. *Leaves* 3–4 by 1¼–1½ in., tapering at the base ; petiole ¾–1 in. thickened at the apex. *Racemes*, 2–3 in. long, many-flowered, from the axils of the fallen leaves. *Pedicels* downy. *Flower-buds* ovate-lanceolate. *Flowers* nodding. *Sepals* ovate-lanceolate, covered with white down. *Petals* oblong-lanceolate, silky on both sides, fringed at the apex. *Anthers* glabrous. *Glands* 10. *Drupe* ¾ in., linear-oblong, glabrous, 1-celled.

38. **E. Griffithii,** *Mast.;* leaves ovate-lanceolate acuminate glabrous, pedicels as long as the petioles, anthers hairy, ovary subglabrous. Monocera Griffithii, *Wight Ill.* i. p. 84, *not of Müll.* M. holopetala, *Zoll. ex Walp. Ann.* i. 113. M. trichanthera, *Griff. Not.* 518, t. 616, f. 3.

TENASSERIM, *Helfer, Griffith ;* MALACCA, *Griffith,* &c.; SINCAPORE, *Maingay.*—DISTRIB. Java.

A small tree. *Leaves* 6 by 2½ in., minutely serrulate, paler beneath ; petiole 2½ in., thickened at the apex. *Racemes* longer than the leaves, erect. *Flower-buds* ovate-lanceolate. *Flower* ½ in. diam. *Sepals* silky. *Petals* lanceolate, entire or slightly laciniate. *Anther-tails* reflexed. *Drupe* olive-shaped, purple, 1-celled ; stone tubercled.

39. **E. integra,** *Wall. Cat.* 2668, *and* 2673; leaves long-petioled glabrous ovate-lanceolate, racemes shorter than the leaves, anthers glabrescent tails reflexed, ovary 2-celled. *C. Müll. Anot. de fam. Elæocarp.* 14. Monocera petiolata, *Jack Mal. Misc. ex Hook. Bot. Misc.* ii. 86. Monoceras petiolatum, *Miq. Fl. Ind. Bat.* i. pt. 2, 212. ?Elæocarpus robustus, *Wall. Cat.* 2664 A.

MALACCA, *Griffith, Maingay;* PENANG; *Wallich;* TENASSERIM, *Helfer;* SILHET, *Wallich.*—DISTRIB. Sumatra, Borneo.

A tree. *Leaves* 5–9 by 2–3 in., entire or minutely serrulate; petiole 2–4 in. *Racemes* erect, many-flowered, shorter than the leaves. *Flower-buds* glabrous externally, ovoid, abruptly acuminate. *Flowers* ½ in. diam. *Sepals* glabrous, lanceolate. *Petals* oblong-lanceolate, silky on both sides. *Stamens* 20–30. *Drupe* ¾ in., smooth, olive-coloured; stone tubercled, 1-celled, 1–2-seeded.—Varies in the proportion of leaf and petiole.

SECT. IV. **Acronodia.** *Flowers* polygamous.

40. **E. Acronodia,** *Mast.;* leaves glabrous lanceolate, anthers beardless, ovary 2-celled. Acronodia punctata, *Blume Bijdr.* 123 ; *Miq. Fl. Ind. Bat.* i. pt. 2, 213.

MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Borneo.

A tree. *Leaves* 2½–3 by ¾ in., acute at both ends, apiculate ; petiole ½ in. *Racemes* shorter than the leaves. *Flowers* ⅓ in. diam. *Sepals* 4–5, oblong, pointed, minutely villous. *Petals* 4–5, spathulate, laciniate at the apex. ♂ *Stamens* 15 ; anthers beardless, muticous. *Pistil* 0. ♀ *Stamens* as in the male, but smaller. *Ovary* ellipsoid, tubercled ; ovules 2 in each cell, pendulous, anatropal, raphe next the placenta. *Drupe* ⅓ in., oblong, obtuse, olive-coloured, smooth, by abortion 1-celled.

DOUBTFUL SPECIES.

E. CHACKROULA, *Ham. in Wall. Cat.* 2674. Gualpara. Of this there is no specimen in Wallich's Herbarium.

E. Jackianus, *Wall. Cat.* 2679, not found in Wallich's Herbarium. It is said to be a native of Sincapore, *Jack.*

E. longifolius, *Wall. Cat.* 6682, from Ava, is indeterminable. It has very long, strap-shaped leaves, pilose along the nerves.

E. monoceroides, *Wight. Ill.* i. p. 84. "*Leaves* glabrous elliptic. *Racemes* lax, few-flowered. *Stamens* indefinite, glabrous. *Anthers* pointed, beardless, shorter than the style."

Monocera ferruginea, *Jack Mal. Misc. ex Hook. Bot. Misc.* ii. 86. "Leaves oblong-ovate, acuminate, entire, under surface as also the peduncles and branchlets ferruginous villous, racemes axillary shorter than the leaves.—*Leaves* 6–7 in., entire, with revolute margins; petiole 2–2½ in., downy. *Drupe* olive-shaped; nut rather smooth, 1-seeded by abortion. *Seed* oblong, pointed, albumen conform, embryo inverse, cotyledons flat, radicle superior and much shorter than the cotyledons."—Jack states that he did not see the flowers.

Note on Roydsia.

At p. 180, it is stated that *Roydsia parviflora*, Griff., is a Tiliaceous plant; this is an error. *R. parviflora* forms with *R. floribunda*, Planch. Mss. (Cuming, Philippine Island collection, n. 541), a subgenus of *Roydsia*, or a new genus closely allied to it, of which the fruit is unknown. These plants differ from *Roydsia suaveolens* and *R. obtusifolia* in the linear-oblong buds, strap-shaped perianth-segments, which are imbricate in two series, in the anthers being entire at the base, in the long stipes of the ovary, subulate style with 3 minute terminal stigmas, and in the few ovules in each cell. I would suggest the name of *Alytostylis* for this genus or subgenus, in allusion to the undivided style. The Philippine Island *R. floribunda*, Planch. Mss., has flowers nearly an inch in diameter, very many stamens, a very slender gynophore, which elongates after flowering, and oblong leaves, 7–9 inches long.

There can be no doubt but that *Roydsia* should, as Griffith observes, form the type of a Natural Order intermediate between *Bixineæ* and *Capparideæ*. Both *Roydsia* and *Alytostylis* differ remarkably in habit from *Tiliaceæ*.

3. **Roydsia (Alytostylis) parviflora,** *Griff. Notul.* iv. 578; *Ic. Plant. Asiat.* t. 607, f. 1; leaves elliptic or elliptic-lanceolate acuminate, perianth-segments ligulate obtuse.

Birma, in woods near the Serpentine Mines at Hookum, *Griffith.*

A climbing shrub. *Leaves* 4–7 by 1¾–2 in., glabrous, rather membranous, pale yellow-green, nerves almost horizontal; petiole ⅓–½ in., slender. *Racemes* short, very pubescent, axillary, and forming small terminal panicles, rachis slender; pedicels shorter than the buds; bracts subulate, caducous. *Flowers* ¼ in. diam., inodorous, densely tomentose; buds oblong. *Perianth* divided nearly to the base into 6, biseriate, imbricate, obtuse, strap-shaped, densely pubescent segments, that are finally recurved, not much shorter than the stamens. *Gynophore* short in flower, slender. *Stamens* about 20, not much exceeding the perianth-segments; anthers not 2-fid at the base. *Ovary* ovoid, densely pubescent, contracted into a stipes as long as itself, 3-celled; style subulate, stigmas 3, minute; ovules about 4 in each cell.

Flowering specimens of *R. obtusifolia*, H. f. & T. (see p. 180), have been recently received from Kurz, collected in Pegu. The flower-buds are very small, globose, tomentose. *Sepals* 6, short, obtuse, apparently valvate, pubescent. *Stamens* about 18, exceeding the perianth. *Ovary* glabrous, on a tomentose gynophore; styles 3, subulate, united at the base.—*J. D. Hooker.*

Order XXIX. **LINEÆ.** (By J. D. Hooker.)

Herbs or shrubs. *Leaves* usually alternate, simple, entire, rarely crenate-serrate; stipules lateral or intrapetiolar or 0. *Inflorescence* various. *Flowers* regular, bisexual. *Sepals* 5, rarely 4, free or connate below, imbricate.

Petals as many, hypogynous or slightly perigynous, usually fugacious, often contorted. *Stamens* 4–5 with as many interposed staminodes, or 8–10, rarely more, filaments united at the base into a hypogynous or slightly perigynous ring, filiform; anthers versatile, 2-celled. *Glands* 5, entire or 2-lobed, usually adnate to the staminal ring, or obsolete. *Ovary* entire, 3–5-celled; styles 3–5, free or more or less connate, stigmas terminal; ovules 1 or 2, inserted in the inner angle of the cells, anatropous, pendulous. *Fruit* usually splitting into 3–5 cocci, rarely a drupe. *Seeds* 1–2 in each cell, testa sometimes winged, albumen fleshy or 0; embryo nearly as long as the seed, straight, rarely incurved, cotyledons broad, radicle superior.—DISTRIB. All regions; genera 14, species about 135.

TRIBE I. **Eulineæ.** *Petals* contorted, fugacious. *Perfect stamens* as many as the petals. *Capsule* septicidal.—Herbs rarely shrubs.

Calyx glabrous or pubescent. Styles 5. Capsule 5-celled . . .	1. LINUM.
Calyx glabrous. Styles 3–4. Capsule 3–4-celled	2. REINWARDTIA.
Calyx setose. Styles 3. Capsule 1-celled, 1-seeded	3. ANISADENIA.

TRIBE II. **Hugonieæ.** *Petals* contorted, fugacious. *Perfect stamens* 2–3 times as many as the petals. *Fruit* a drupe.—Usually scandent shrubs, with hooked woody tendrils formed of arrested branchlets.

Sepals subacute, tomentose, ebracteolate	4. HUGONIA.
Sepals obtuse, bracteolate	5. ROUCHERIA.

TRIBE III. **Erythroxyleæ.** *Petals* imbricate, rarely contorted, with a scale on the inner face, at length deciduous. *Perfect stamens* twice as many as the petals. *Fruit* a drupe.—Shrubs or trees.

Pedicels axillary. Petals with a double scale	6. ERYTHROXYLON.

TRIBE IV. **Ixonantheæ.** *Petals* contorted, persistent. *Stamens* 2–3–4 times as many as the petals. *Capsule* septicidal.

Stamens perigynous	7. IXONANTHES.

1. LINUM, Linn.

Herbs, rarely shrubby below. *Leaves* narrow, quite entire; stipules 0, or replaced by glands. *Sepals* 5, quite entire. *Petals* 5, contorted, fugacious. *Stamens* 5, often alternating with minute staminodes. *Glands* opposite the petals, adnate to the staminal ring. *Ovary* 5-celled, cells 2-locellate, 2-ovuled; styles usually free, stigmas various; ovules 10, 1 in each locellus. *Capsule* 5-celled, septicidally splitting into 5 simple 2-seeded or 10 1-seeded cocci. *Seeds* compressed, albumen sparing; embryo straight.—Species about 80, most of them Mediterranean.

1. **L. usitatissimum,** *Linn.*; annual, stem cylindric erect simple below, leaves narrow sub-3-nerved, petals blue, styles quite free, stigmas linear-clavate, capsule scarcely exceeding the narrowly white-margined, acuminate sepals. *Wall. Cat.* 1504; *Don Prodr.* 217; *Roxb. Fl. Ind.* ii. 110; *Gibs. & Dalz. Bomb. Fl. Suppl.* 16; *DC. Prodr.* 217; *W. & A. Prodr.* 134. L. trinervium, *Roth Nov. Sp.* 187.

Cultivated chiefly for oil throughout INDIA, up to 6000 ft., in the Himalaya.—DISTRIB. Westwards to the Atlantic.

Stems 2–4 ft., often solitary, corymbosely branched above. *Leaves* linear or lanceolate, without stipular glands. *Flowers* 1 in. diam., in broad cymes. *Sepals* ovate, acuminate, 3-nerved, eglandular, margins ciliate or not.—The Indian plant has the ciliated axile margins of the carpels of *L. humile*, Mill., and the crenate petals (Roxb.) and smooth leaf-margins of *L. usitatissimum*, and is thus intermediate between these supposed species. Roth's specimens of *trinervium* (from Herb. Rottler) are from a garden; they are very imperfect, but clearly *L. usitatissimum*.

2. **L. perenne,** *Linn.*; perennial, stems many from the roots, leaves all lanceolate or lower oblong obtuse and upper linear acute, petals blue entire, styles quite free, stigmas subcapitate, capsule much longer than the white-margined sepals.

Western Tibet, alt. 9–13,000 ft., *Hb. Royle, Munro*, &c.; Lahul, *Jaeschke.*—Distrib. Westwards to the Canaries.

Stem 1–3 ft. high. *Leaves* ½–¾ in., without stipular glands. *Cymes* few-flowered, racemose. *Flowers* 1 in. broad. *Sepals* ovate or obovate, 3–5-nerved. *Capsule* as large as a pea, on a slender pedicel. *Sepals* with glandular margins.

Var. *Stocksianum*, Boiss. *Fl. Orient.* i. 865; more glaucous, cymes very few-flowered. L. Stocksianum, *Boiss. Diagn. Ser.* 2, i. 98.—Scarcely different from the type.

3. **L. strictum,** *Linn.*; annual, leaves linear linear-oblong or lanceolate 1-nerved margins and keel scabrid, petals yellow, styles quite free stigmas capitate, capsule globose shorter than the long acuminate sepals. *Boiss. Fl. Orient.* i. 852.

Var. *corymbulosum*, Planch. in Hook. Lond. Journ. Bot., vii. 476; corymbs lax-flowered, pedicels longer than the calyx. L. corymbulosum, *Reichb.; Boiss. Fl. Orient.* i. 852.

The Punjab hills, &c., extending to Peshawur and Marri, *Jacquemont*, &c. Western Tibet, alt. 10,000 ft., *Falconer*, &c.—Distrib. From Soongaria to N. Africa and Italy.

A slender annual, perhaps at times biennial, usually corymbosely branched above, glabrous or sparingly pubescent. *Leaves* ¼–½ in., acuminate, without stipular glands. *Flowers* ¼–¾ in diam., shortly pedicelled, in corymbose cymes. *Sepals* with very long rigid green points, about equalling the pedicels, margins glandular. *Capsule* ¼ in. diam., globose—Cultivated in Affghanistan for oil and fodder, and not for flax (*Griffith, It. Notes*, 313).

4. **L. mysorense,** *Heyne in Wall. Cat.* 1507; annual, stem corymbosely branched above, leaves oblong or elliptic-oblong narrowed at the base obtuse or acute 3-nerved, petals yellow small but exceeding the calyx, styles connate below stigma capitate, capsule about equalling the ovate acute sepals. *W. & A. Prodr.* i. 134; *Thwaites Enum.* 25; *Benth. in Bot. Reg. under tab.* 1326; *Dalz. & Gibs. Bomb. Flor.* 16. L. humile, *Heyne mss.* L. trinervium, *Herb. Hohenhack, not of Roth.*

Exposed hills of the Western Peninsula, from the Concan, Kandalla and the Deccan to the Nilghiris. Western Himalaya, Garwhal, alt., 3–5000 ft., *Jacquemont, Royle*, &c. Ceylon, alt. 4–6000 ft., *Thwaites.*

A small slender glabrous herb, usually much corymbosely branched above. *Leaves* ⅓–⅔ in., variable in breadth and somewhat in form, without stipular glands. *Flowers* ¼ in. diam, in panicled corymbs, the branches of which elongate as unilateral cymes in fruit. *Sepals* with white eglandular margins and short points. *Filaments* connate below, dilated above. *Capsule* ⅛ in. diam., globose.

2. **REINWARDTIA,** Dumort.

Undershrubs. *Leaves* alternate, quite entire or crenate-serrate; stipules minute, subulate, caducous. *Flowers* yellow, in axillary and terminal cymose fascicles, rarely solitary. *Sepals* 5, quite entire, lanceolate, acuminate. *Petals* 5, contorted, fugacious, much longer than the sepals. *Stamens* 5, hypogynous, connate below, alternating with as many interposed subulate staminodes. *Glands* 2–3, adnate to the staminal ring. *Ovary* 3–5-celled, cells 2-locellate; styles 3–4, filiform, free or connate below, stigmas subcapitate; ovules 1 in each locellus. *Capsule* globose, splitting into 6–8 cocci. *Seeds* reniform.—DISTRIB. The following are the only species.

1. **R. trigyna,** *Planch. in Hook. Lond. Journ. Bot.* vii. 522; leaves elliptic-obovate with the tip rounded or elliptic and subacute quite entire or minutely crenate-serrate, styles 3 free or connate at the base. R. indica, *Dumort. Comm. Bot.* 19. R. repens, *Planch. l.c.* 523. Linum trigynum, *Roxb. Fl. Ind.* ii. 110; *Smith Exot. Bot.* 31, t. 17; *Bot. Mag.* t. 1100; *Wall. Cat.* 1505; *W. & A. Prodr.* 134. L. repens, *Don Prodr.* 217. Macrolinum trigynum, *Reichb. Ic. Fl. Germ.* iii. 68. Kittelocharis trigyna, *Alef. in Bot. Zeit.* 1863, 282.

Hilly parts of India, from the PUNJAB eastwards to SIKKIM, ascending to 6000 ft. BEHAR, ASSAM, and CHITTAGONG, and southwards from the BOMBAY GHATS to the NILGHIRI HILLS.

A tufted glabrous undershrub, 2–3 ft. high, with erect and prostrate rooting terete rather stout soft branches. *Leaves* 1–3 in., narrowed into slender petioles, usually rounded and mucronate at the tip, and then quite entire, but sometimes acute or even suddenly acuminate, and then minutely crenate-serrate. *Flowers* often 1 in. diam., but variable in number, size, length of pedicel, and of sepals, which are sometimes ⅝ in. long. *Capsule* shorter than the sepals, the size of a small pea.—If, as is probable, this and the following species are varieties of one, Dumortier's name of *R. indica* should be retained for both.

2. **R. tetragyna,** *Planch. in Hook. Lond. Journ. Bot.* vii. 523; leaves elliptic-lanceolate acuminate crenate-serrate, styles 3–4 united below. R. trigyna, *Dalz. & Gibs. Bomb. Flor.* 16. Linum tetragynum, *Coleb. in Wall. Cat.* 1506; *Benth. in Bot. Reg. under tab.* 1326. L. Cicanobum, *Don Prodr.* 217.

In the same regions as *R. trigyna*, but usually in damper localities.

Easily distinguished from the common type of *R. trigyna* by the much larger lanceolate leaves, and more numerous styles, but variable in the former respect, and I suspect that the two are varieties of one.—I have a note to the effect that 5 styles occur.

3. ANISADENIA, Wall.

Perennial herbs. *Leaves* alternate or somewhat whorled at the top of the stem, coriaceous, serrate; stipules intrapetiolar, striate. *Flowers* in terminal spike-like racemes, white or pink; bracts minute, coriaceous, concave, grooved, caducous, pedicels at length reflexed. *Sepals* 5, lanceolate, coriaceous, strongly nerved, 3 outer with spreading gland-tipped bristles, 2 inner glandular. *Petals* 5, contorted, fugacious. *Stamens* 5, hypogynous, filaments connate below, alternating with interposed staminodes. *Glands* usually 3, adnate to the staminal tube, one very large. *Ovary* 3-celled; styles 3, stigmas terminal; ovules 2, collateral in each cell. *Capsule* oblong, membranous, indehiscent? 1-seeded. *Seed* oblong, testa adherent to the thin albumen; embryo straight, green, cotyledons plano-convex.—DISTRIB. The following are the only species.

1. **A. saxatilis,** *Wall. Cat.* 1510; stem glabrous leafy at the summit, leaves 2–5-in. glabrous above sparingly pubescent or glabrous beneath. A. Khasyana, *Griff. Notul.* iv. 534; *Ic. Pl. Asiat.* t. 593 (*middle figure*).

CENTRAL and EASTERN TEMPERATE HIMALAYA; Nipal, Sikkim, alt. 6–8000 ft., and the KHASIA MTS., alt. 5–6000 ft.

Stem curved at the base, ascending, rather stout, often 1 ft. long below the foliage, always simple, lower part often creeping. *Leaves* approximate, spreading, elliptic-lanceolate, acuminate, glaucous beneath, margin quite entire or obscurely waved or crisped. *Raceme* 2–5 in. long, quite simple. *Flowers* ¼–⅓ diam., pink; pedicel very short. *Calyx* ⅙ in. long.

2. **A. pubescens,** *Griff. Notul.* iv. 535; *Ic. Pl. Asiat.* t. 593 (*right hand figure*); stem pubescent leafy all the way up, leaves 1–1½ in. with appressed hairs above silkily villous beneath.

KHASIA MTS., alt. 5–6000 ft., *Griffith*, &c.

More slender than *A. saxatilis*, stem elongate, prostrate, often much-branched; branches including the racemes 6–15 in. *Leaves* alternate, whitish beneath, elliptic, acute at both ends, margin quite entire, sometimes undulate, nerves very oblique; petiole ⅛–½ in. *Raceme* very slender, simple above, the lower peduncles 2–3-flowered, short, erect, and as well as the rachis tomentose. *Calyx* ¼ in. long, gland-tipped hairs more robust than in *A. saxatilis*. *Flowers* ½ in. diam., white, much larger than in *A. saxatilis*.

4. HUGONIA, Linn.

Climbing, often tomentose shrubs. *Leaves* alternate, serrate, stipulate. *Inflorescence* various; flowers yellow, lower peduncles converted into spiral hooks. *Sepals* 5. *Petals* 5, contorted, fugacious. *Stamens* 10, hypogynous, with glandular swellings on the basal ring between the filaments, which are connate below. *Ovary* 5-celled; styles 5, filiform, stigmas capitate; ovules 2, collateral in each cell. *Drupe* globose. *Seeds* compressed, albuminous; embryo straight or slightly curved, cotyledons flat.—DISTRIB. Tropical Asia and Africa; species about 6.

1. **H. Mystax,** *Linn.*; leaves elliptic-obovate or obovate-oblong obtuse or subacute quite entire reticulate on both surfaces. *Wall. Cat.* 1201; *W. & A. Prodr.* 72; *Wight Ill.* 79, t. 32; *Planch. in Hook. Lond. Journ. Bot.* vii. 524; *Dalz. & Gibs. Bomb. Flor.* 17. H. obovata, *Ham. in Trans. Linn. Soc.* xiv. 205.—*Rheede Hort. Mal.* ii. t. 19.

WESTERN PENINSULA, from the Concan to Travancor. CEYLON.

A rambling leafy shrub; branches, tendrils, and sepals densely clothed with brown tomentum. *Leaves* crowded, 1½–2½ in., rather thin, nerves spreading; stipules subulate, undivided. *Flowers* 1–1½ in. diam., terminal and in the upper axils, shortly pedicelled, yellow. *Stamens* alternately long and short. *Fruit* globose, shorter than the sepals.

2. **H. ferruginea,** *W. & A. Prodr.* 72; leaves elliptic long acuminate quite entire densely silkily villous beneath, veins arched not reticulate.

CEYLON, hotter and drier parts of the island.

A rambling or climbing shrub; branches, tendrils, and sepals densely velvety. *Leaves* 2–5 by 1½–2 in., rather coriaceous, finely silky above when young, glabrous when old, midrib and arched nerves strong; stipules subulate. *Flowers* about half the size of those of *H. Mystax*.

5. ROUCHERIA, Planch.

Erect or climbing trees or shrubs with revolute woody tendrils. *Leaves* quite entire or glandular-serrate, coriaceous, penninerved; stipules minute, caducous. *Flowers* axillary, yellow, subsessile, or in excessively short fascicled spikes; pedicels bracteolate. *Sepals* 5. *Petals* 5, hypogynous, contorted, fugacious. *Stamens* 10, all fertile, filaments connate into a short tube below. *Glands* obsolete. *Ovary* 3–5-celled; styles 3-5, filiform, stigmas cuneate, 2-lobed; ovules 2, collateral. *Drupe* scarcely fleshy, subglobose; stone 3–6-angled, bony, cells 1–2-seeded. *Seeds* compressed, pendulous; albumen rather fleshy, embryo with foliaceous cotyledons and an elongate radicle.—DISTRIB. 3 or 4 species, one or more Malayan and Bornean, and 2 from Guiana.

1. **R. Griffithiana,** *Planch. in Hook. Lond. Jour. Bot.* vi. 143, vii. 527; leaves lanceolate or elliptic- or obovate-lanceolate obtusely caudate-acuminate crenate-serrate, drupe 1-celled 1-seeded.

MALACCA, *Griffith, Maingay.*—DISTRIB. Sumatra, Borneo.

A climbing shrub, perfectly glabrous. *Leaves* 3–5 in., alternate, coriaceous, complicate, shining above, nerves few, arched; petiole $\frac{1}{3}$ in., slender. *Flowers* $\frac{1}{3}$ in. diam., 7–8 in a cluster; pedicels very short, densely bracteate. *Petals* narrow, very fugacious. *Drupe* the size of a small pea.—There cannot be much doubt of this constituting the genus *Sarcotheca,* Blume, though he describes the calyx as ebracteate, the ovules as superposed, and the fruit as a bacciform capsule, dehiscing by 5 apical fissures.

6. **ERYTHROXYLON,** Linn.

Shrubs or small trees, usually quite glabrous. *Leaves* alternate, quite entire, often subdistichous; stipules intrapetiolar, often imbricating on short arrested leafless branches. *Flowers* axillary, small, white or pink, solitary or fascicled; peduncles bracteolate, *Sepals* 5, rarely 6, free or connate. *Petals* 5, hypogynous, deciduous, with an erect double ligula on the inner face, imbricate. *Stamens* 10, rarely 12, filaments united into a glandular or eglandular tube. *Ovary* 3- rarely 4-celled; styles 3, rarely 4, free or connate (connate in all Indian species), stigmas capitate; ovules 1, rarely 2 in each cell. *Drupe* 1-celled, 1-seeded. *Seed* with a thin testa, albumen variable in quantity or 0; embryo straight, cotyledons plano-convex, radicle short.—DISTRIB. Species about 50, four-fifths of them American, and almost all tropical. The Indian species are not easy of discrimination.

* *Leaves* glaucous brown beneath when dry.

1. **E. monogynum,** *Roxb. Cor. Pl.* i. t. 88; *Flor. Ind.* ii. 449; leaves 1–2 by $\frac{2}{3}$–1 in. obovate or elliptic- or cuneate-obovate tip rounded hardly shining above pale glaucous brown beneath when dry, nerves oblique much reticulated, peduncles $\frac{1}{4}$–$\frac{1}{3}$ in. E. indicum, *Beddome Flor. Sylvat.* t. 81. Sethia indica, *DC. Prodr.* i. 576; *Wall. Cat.* 6848; *W. & A. Prodr.* 106; *Wight Ill.* t. 48.

Hilly parts of the WESTERN PENINSULA, *Rottler,* &c.; CEYLON, in hot dry parts of the Island.

A shrub with pale bark. *Leaves* the smallest of the Indian species, always more or less cuneate-obovate, the primary nerves hardly distinguishable from the secondary, and these last not connected with an evident intramarginal one; petiole sometimes $\frac{1}{2}$ in. —The Ceylon specimens have larger leaves and longer pedicels. This is very closely allied to, if not identical with, an Eastern African species.

2. **E. Kunthianum,** *Wall. Cat.* 6849 (*Sethia ?*); leaves $2\frac{1}{2}$–$3\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{4}$ in. elliptic-lanceolate rarely elliptic-obovate acute or acuminate rarely obtuse or rounded at the tip opaque above pale glaucous-brown beneath when dry with a reddish midrib, nerves sub-horizontal very faint. ? E. Kunthianum, *Kurz in Journ. Beng. Asiat. Soc.* xli. pt. ii. 294.

EASTERN BENGAL, and Khasia hills, alt. 3–5000 ft.; ? Martaban, *Kurz.*

A shrub, 3–6 ft. *Leaves* very faintly reticulate on both surfaces, the secondary nerves not collected into an obvious intramarginal nerve; petiole very short. *Drupe* $\frac{1}{2}$ in. long, slender, equalling the pedicel.—I have not seen Kurz's specimens.

VAR. ? *Parishii;* leaves smaller $1\frac{1}{2}$ in. acute pale with more prominent nerves.—Top of Thounggyun in Moulmein, *Parish.*

3. **E. burmanicum,** *Griff. Notul.* iv. 468; *Ic. Plant. Asiat.* t. 581, f. 3 (*flower*); a tree, leaves 1–$2\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{4}$ in. obovate-oblong or obovate very

obtuse or emarginate glaucous beneath nerves horizontal faint not forming an intramarginal nerve, pedicels $\frac{1}{4}$–$\frac{1}{3}$ in. solitary or geminate. E. sumatranum, *Miq. Flor. Ind. Bat. Suppl.* i. 572. E. retusum, *Bauer ex Teysm. & Binnend. in Tydschr. v. Naturch. Ver. Ned. Ind.* xxviii. 71 (*according to Kurz*).

EASTERN PENINSULA, TENASSERIM, and ANDAMAN ISLDS., *Helfer;* MERGUI, *Griffith;* MALACCA, *Griffith, Maingay;* PENANG, *Phillips.*—DISTRIB. Sumatra.

Very near to *E. Kunthianum*, but with more obovate and more obtuse leaves; it is further described as a tall tree, whilst the Khasia plant is a mere bush. The Penang and some Malaccan specimens have much smaller leaves than the Mergui ones.—I have seen no Sumatran specimens.

** *Leaves* not glaucous beneath, but more or less shining on both surfaces.

4. **E. lanceolatum,** *Wight Ill.* i. 136 (*Sethia*); leaves 2–4 by $\frac{3}{4}$-in. elliptic-lanceolate obtuse shining on both surfaces nerves oblique, peduncles $\frac{1}{4}$–$\frac{3}{4}$ in. very slender. Sethia lanceolata, *Thwaites Enum.* 54. S. erythroxyloides, *Wight, l.c.*

WESTERN PENINSULA; Courtallum, *Wight;* CEYLON, banks of streams, Galagama district, alt. 2–3000 ft., *Thwaites*, &c.

An erect branching shrub. *Leaves* sometimes slightly contracted towards the base, nerves not connate into a distinct intramarginal one; petiole $\frac{1}{10}$–$\frac{1}{8}$ in.—Wight's var. *obtusifolium* and his *S. erythoxyloides* are hardly distinguishable; the latter is a short-styled form, with alternately longer stamens; another form with longer styles and shorter stamens occurs; as is the case with the two following species;—all are no doubt dimorphous.

5. **E. lucidum,** *Moon Cat. Ceyl. Pl.* 36; leaves 2–3 by $\frac{3}{4}$–1 in. elliptic-lanceolate obtusely caudate-acuminate opaque or shining above shining beneath nerves nearly horizontal, pedicels $\frac{1}{10}$–$\frac{1}{4}$ in. Sethia acuminata, *Arn. in Act. Acad. Nat. Cur.* xviii. 324; *Wight Ill.* i. 135; *Thwaites Enum.* 54.

CEYLON; Ambagamowa and Saffragam districts, alt. 1000 ft., *Walker.*

This differs from *E. lanceolatum* in the long points to the comparatively broader leaves, which have furthermore horizontal nerves; and in the short stout peduncles. Thwaites notices two forms of flower, one (*stylosa*) with the alternate stamens longer, and a shorter style; the other (*staminea*) with equal stamens and a longer style.—The expressed juice of the fresh leaves is given by the Cinghalese as an anthelmintic to children. There is á very similar species to this, a variety of it, in Borneo.

6. **E. obtusifolium,** *Thwaites Enum.* 54; leaves 2–3$\frac{1}{2}$ by 1$\frac{1}{4}$–1$\frac{3}{4}$ in. obovate-obtuse or broadly oblong tip rounded or obtusely pointed rather shining on both surfaces nerves rather oblique elevated, pedicels short stout.

CEYLON; Central Provinces, alt. 2–4000 ft., *Thwaites.*

I follow Thwaites in retaining this as a distinct species, though I can scarcely doubt its being a broad-leaved state of *E. lanceolatum*, its nerves are less oblique however. It occurs under the two forms of long stamens and short style and vice versâ. *Fruit* in Thwaites's drawing $\frac{1}{3}$ in. long, linear-oblong, straight, red. Thwaites refers to this the *S. lanceolata*, var. *obtusifolia* of Wight, which is, however, clearly a very trifling variety of *S. lanceolatum.*

DOUBTFUL SPECIES.

E. SIDEROXYLOIDES, *Lamk.* This is a Mauritian species, mentioned by Roxburgh (ii. 449) as having been sent from Ceylon to the Botanic Garden of Calcutta by General Macdowall, and as being also a native of Coromandel. As no description is given I cannot say to which of the above Roxburgh's Coromandel species it should be referred.

7. **IXONANTHES,** Jack. (Ixionanthes, *Auct.*)

Glabrous trees, turning black in drying. *Leaves* alternate, entire or crenate-serrate, nerves reticulate; stipules minute or 0. *Flowers* small, in axillary cymose dichotomous peduncled panicles. *Sepals* 5–6, shortly connate at the base. *Petals* 5–6, perigynous, contorted, persistent, hardened round the fruit. *Stamens* 10–20, inserted on the outside of a perigynous annular or cupular eglandular disk. *Ovary* free, 5–6-celled, cells sometimes 2-locellate; style simple, stigma capitate lobed; ovules two in each cell. *Capsule* coriaceous or woody, oblong or conic, septicidal, carpels opening inward. *Seeds* (according to Griffith) winged or crowned with a mitriform aril, albumen fleshy; embryo lateral, cotyledons foliaceous, radicle superior.—DISTRIB. Species 6–8, all tropical Asiatic, and chiefly Malayan.

1. **I. icosandra,** *Jack Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 154; leaves obovate or obovate-oblong obtuse quite entire or crenate narrowed into a very short petiole, stamens 10–20, capsule $\frac{3}{4}$ by $\frac{1}{4}$ in. very narrow ovoid. *Miq. Fl. Ind. Bat.* i. pt. 2, 494. I. dodecandra, *Griff. Plant. Cantor.* 12. Gordonia? peduncularis, *Wall. Cat.* 4409. Hypericinea dentata, *Wall. Cat.* 4832. Pierotia lucida, *Blume Mus. Bot.* i. 180. Brewstera crenata, *Roem. Synops.* i. 141. Macharisia icosandra, *Planch. mss.—Griff. Notul.* iv. 498; *Ic. Pl. Asiat.* t. 589, f. 2.

PENANG, *Wallich;* MALACCA, *Griffith, Maingay;* SINCAPORE, *Lobb.*—DISTRIB. Sumatra.

A small tree. *Leaves* 3–7 by $1\frac{1}{2}$–2 in., very variable, always narrowed into the petiole, which varies from $\frac{1}{10}$–$\frac{1}{2}$ in., brown when dry, shining on both surfaces, margins thickened, nerves very slender almost horizontal, tip obtuse rounded or emarginate. *Peduncles* slender, straight, often exceeding the leaves. *Flowers* about $\frac{1}{8}$ in. long.—Without authentic specimens the identity of this with Jack's plant cannot be verified. Though it differs from his description in the usually small leaves, and in the often fewer stamens, I have followed my predecessors in referring it to his *I. icosandra.* Jack describes the flowers as 5–6-merous. The pedicels appear to elongate very much as the bud advances, and up to the ripening of the fruit. There are perhaps two varieties, one with peduncles shorter than the leaves, and longer pedicels.

2. **I. cuneata,** *Miq. Fl. Ind. Bat. Suppl.* i. 484; leaves oblong-spathulate or obovate-oblong obtuse quite entire or crenate narrowed into a very short petiole, cymes peduncled, stamens about 10, capsule turgid $\frac{1}{2}$–$\frac{2}{3}$ by $\frac{1}{3}$ in. broadly ovoid.

MALACCA, *Maingay.*—DISTRIB. Sumatra.

I retain this species with great doubt, the foliage and flowers appear to be identical with those of *I. icosandra,* but the capsule is very much broader for its length. I have seen two Sumatran specimens thus named by Miquel himself, of which one alone has these broad capsules; the other appears to be in this as in every other respect, identical with *I. icosandra.* Miquel does not describe the capsule, and I hence do not know which he meant to be *I. cuneata.*

3. **I. khasiana,** *Hook. f.;* leaves elliptic-lanceolate obtusely acuminate quite entire narrowed into a slender petiole, nerves very oblique, peduncles slender shorter than the leaves, cymes dense-flowered. Hypericinea pedunculosa, *Wall. Cat.* 4826.

KHASIA MTS., *F. de Silva.*

Similar in habit to *I. icosandra,* but the leaves are of a totally different shape, much more membranous, and the flowers are twice as large. *Leaves* 3–$4\frac{1}{2}$ in., membranous;

nerves numerous, oblique; petiole ½–¾ in. *Peduncles* shorter than the leaves. *Flowers* ⅓ in. diam. *Stamens* 10.

4. **I. obovata,** *Hook. f.;* leaves broadly obovate rounded at the apex sinuate-crenate narrowed into a slender petiole nerves nearly horizontal, stamens 12 or more, capsule (unripe) ⅓ by ⅙ in. narrow ovoid.

Eastern Peninsula; Sincapore, *Lobb.*

A very distinct species, easily recognised by the broad flat obovate leaves, 2–4 by 1½–2½ in., with nearly horizontal nerves, the tip is rounded and often emarginate, and the margins have long very shallow crenatures. *Peduncles* very slender, equalling or exceeding the leaves; cymes rather crowded. *Flowers* about the size of those of *I. icosandra.*

5. **I. reticulata,** *Jack in Mal. Misc.* ii. No. 7, 51; leaves elliptic-oblong obtuse quite entire scarcely narrowed into the slender petiole nerves arching much reticulated on both surfaces, peduncles very stout, stamens 10, capsule 1–1½ by ⅔ in. ovoid, valves grooved at the back. *Griffith Plant. Cantor* 11. Hypericinea macrocarpa, *Wall. Cat.* 4833. Gordonia decandra, *Roxb. Fl. Ind.* ii. 573; *Wall. Cat.* 4408.

Eastern Peninsula; Malacca, *Maingay; Sincapore, Wallich.*—Distrib. Sumatra.

Leaves 3–5 by 1½–2½ in.; petiole 1 in., very slender. *Peduncles* shorter than or equalling the leaves. *Sepals* in fruit ⅓ in. long, very thick.—Wallich's specimens have a shorter, more turgid capsule than Maingay's, and more shining leaves, with a decidedly recurved margin. This accords best with Jack's description of *I. reticulata,* though, as with *I. icosandra,* its identity cannot be satisfactorily ascertained. It differs in the leaves not having very thickened margins, and not being glaucous beneath. It approaches the *I. chinensis,* but the fruit is very much larger, and may be identified with a Bornean species, of which, however, I have seen no fruit.

Order XXX. MALPIGHIACEÆ. (By J. D. Hooker.)

Trees or shrubs, often climbing. *Leaves* (in the Indian genera) opposite, quite entire; stipules small or 0. *Inflorescence* axillary or terminal; pedicels articulate, usually 2-bracteolate. *Flowers* middling sized or small, white or yellow, more rarely red yellow or blue, hermaphrodite, regular or irregular. *Calyx* usually 5-partite; segments imbricate or valvate, 1 or more (never all) furnished with a large gland, rarely eglandular (*Aspidopterys*). *Petals* 5, clawed or not, often fimbriate, imbricate. *Disk* obscure. *Stamens* 10, hypogynous or subperigynous, equal or 1 or more much larger than the others, filaments free or connate below, anthers 2-lobed. *Ovary* 3-celled; styles 1–3, straight or circinate, stigmas capitate or punctiform or lateral; ovules solitary in each cell, micropyle superior, raphe ventral. *Fruit* (in the Asiatic genera) of one or more winged samaras. *Seed* exalbuminous; embryo straight or curved, radicle superior.—Distrib. A very large American Order, scantily represented in Africa and still more so in Asia; genera about 50, species about 600.

Styles 1 rarely 2.

Calycine glands minute or 0 . . . . 1. Tristellateia.
Calycine gland 1, large, adnate to the pedicel . . . . 2. Hiptage.

Styles 3.

Calycine glands 0 . . . . 3. Aspidopterys.

1. **TRISTELLATEIA,** Thouars.

Woody-climbers. *Leaves* opposite or whorled; petiole 1–2-glandular at the top; stipules minute. *Flowers* yellow, in terminal or lateral racemes. *Calyx* 5-partite, eglandular, or with minute glands. *Petals* 5-clawed. *Stamens* 10, all perfect; filaments rigid, truncate and articulate at the top; anthers acute. *Ovary* 3-lobed; styles 1–3, slender, one or more reduced to small papillæ. *Ripe carpels* 3, each with about 3 or more wings, the whole forming a stellate fruit. *Seed* obovoid, testa membranous; cotyledons fleshy, hooked.—DISTRIB. About 8 species, natives of tropical Africa, Asia, and Australasia.

1. **T. australasica,** *A. Rich. Sert. Astrol.* 38, t. 15; *Benth. Flor. Austral.* i. 286. Platynema laurifolium, *W. & A. in Edin. New Phil. Journ.* 1833, 179; *Prodr.* 107.

EASTERN ARCHIPELAGO; Sincapore, *Herb. Wight*, &c.—DISTRIB. Eastwards to New Ireland.

Glabrous. *Leaves* 2–4 in., ovate or elliptic, acute, membranous, quite entire; petiole 1- or eglandular. *Racemes* terminal, 4–6 in. *Flowers* 1 in. diam.; pedicels opposite, minutely 2-bracteolate below the middle. *Petals* ovate-cordate, claw slender. *Fruit* ½ in. diam.; carpel-wings coriaceous, spreading and recurved, linear-oblong, vertically compressed.—Wight's specimens, stated in the Prodromus to be from Ceylon, were from Sincapore.

2. **HIPTAGE,** Gærtner.

Climbing or suberect shrubs. *Leaves* opposite, quite entire, coriaceous, eglandular, or with a row of remote intramarginal glands beneath; stipules 0. *Racemes* terminal or axillary, simple or compound; peduncles erect, bracteate, articulate with the 2-bracteolate pedicels. *Flowers* white, fragrant, the 5th petal discoloured. *Calyx* 5-partite; glands large, adnate to the pedicel. *Petals* 5, clawed, unequal, silky. *Stamens* 10, declinate, all fertile, one much the largest, filaments connate at the base. *Ovary* 3-lobed, lobes appendiculate; styles 1–2 circinate, the others rudimentary, stigmas 1 or 2. *Fruit* of 1–3, 2–3-winged samaras. *Seed* subglobose; cotyledons thick, unequal.—DISTRIB. Four species, all tropical Asiatic.

1. **H. Madablota,** *Gærtn. Fruct.* ii. 169, t. 116; branches stout, leaves 4–6 in. oblong or ovate-lanceolate acuminate or cordate-acuminate, racemes with densely appressed pubescence, flowers ¾–1 in. diam., carpels with a central wing between the 2 lateral. *DC. Prodr.* i. 583; *W. & A. Prodr.* 107; *Wall. Cat.* 1063; *Wight Ill.* t. 50. Molina racemosa, *Lamk. Dict.* iv. 227; *Cav. Diss.* ix. t. 263. Gærtnera racemosa, *Roxb. Cor. Pl.* i. t. 18; *Fl. Ind.* ii. 368. Banisteria bengalensis, *Linn.* B. unicapsularis, *Lamk.* B. tetraptera, *Sonnerat Voy.* ii. t. 135.—*Rheede Hort. Mal.* vi. t. 59.

Throughout the hotter parts of India, from JAMU and SINDH to BIRMA, MALACCA, and CEYLON.—DISTRIB. China, Java.

A tall climber, glabrous except the young parts and inflorescence, which are hoary or appressed-tomentose. *Leaves* 3–6 in., coriaceous, petioled, shining above. *Racemes* 1–6 in., axillary, usually forming a leafy panicle. *Flower* ½–¾ in. diam., fragrant, white. *Sepals* obtuse. *Petals* twice as long, fimbriate, 5th petal yellow at the base. *Wings of carpels* oblong, coriaceous, inner 1–2 in. linear-oblong, outer narrower shorter spreading.—*G. obtusifolia*, DC., a native of China and Birma, differs chiefly in its smaller size.

2. **H. parvifolia,** *W. & A. Prodr.* 107, *excl. syn.*; branches and shoots elongate twiggy, leaves about 3 in. elliptic acute or acuminate glabrous, racemes with appressed pubescence, flowers ½ in. diam., carpels usually without the additional wing. Gærtnera laurifolia, *Herb. Madr. ex Wall. Cat.* 7265.

WESTERN PENINSULA; Mysore, *Rottler;* Courtallum, *Wight;* CEYLON, hot and dry parts of the Island, *Gardner*, &c.

Smaller in all its parts than *H. Madablota*, and with usually two styles; the pubescence of the inflorescence is appressed, in which respects it differs from *H. sericea.*

3. **H. sericea,** *Hook. f.*; branchlets short slender, leaves about 2–3 in. elliptic or ovate acuminate glabrous, racemes short laxly soft tomentose or villous, flowers ⅓–½ in. diam., carpels with an intermediate ridge. H. parviflora, *Wight. Cat.* 358. Clerodendon sericeum, *Wall. Cat.* 1824.

EASTERN PENINSULA; PENANG, *Wallich;* MALACCA, *Griffith*, *Maingay.*

Branches and inflorescence clothed with soft brown villous pubescence. *Leaves* always small. *Racemes* axillary and terminal, short, dense-flowered; pedicel much thickened from beneath the flower downwards.—The habitat of Ceylon given by Wight and Arnott is, no doubt, an error, originating with that respecting *Tristellateia australasica.*

4. **H. acuminata,** *Wall. Cat.* 1065; branches stout woody scabrid, leaves 3–4 in. lanceolate acuminate glabrous, racemes short dense clothed with thick brown tomentum, flowers ⅔ in. diam., fruit unknown.

KHASIA MTS, at Churra, alt. 4000 ft., *Gomez*, &c.

A bushy dense shrub. *Leaves* coriaceous, usually caudate-acuminate; nerves very oblique, few, arched, reticulate on both surfaces; petiole short, stout. *Racemes* much shorter than the leaves, sometimes corymbose.—A chain of very fine reticulate nerves borders the leaf beneath, in which are often (not always) remote deeply impressed points or glands.

5. **H. candicans,** *Hook. f.*; branchlets slender and with the leaves beneath clothed with soft fine white cottony pubescence, leaves on young shoots 1–2 in. oblong or orbicular on old 4–5 in. elliptic-oblong, carpels with no intermediate ridge or wing. Flacourtiacea, *Wall. Cat.* 9020.

BIRMA; banks below Yenangheum, *Wallich;* sandy woods in the Kivakdwong, above Bamo, *Griffith.*

A very distinct species, apparently scandent or sarmentose: the shoots with small rounded leaves resemble the pinnate leaves of a Leguminous climber. The leaves are of a very pale colour, rather shining on the upper surface, and all obtuse or apiculate; the nerves are indistinct. There are no flowers, and only imperfect fruits, which are pubescent.

EXCLUDED SPECIES.

HIPTAGE, Wall. Cat. 9029, from Herb. Heyne, is *Terminalia paniculata.*

3. ASPIDOPTERYS, A. Juss.

Shrubs, usually climbing. *Leaves* opposite, eglandular, quite entire; stipules 0. *Flowers* in simple or compound axillary and terminal panicles; peduncles bracteate, jointed at the top, pedicels often minutely 2-bracteolate. *Flowers* small, yellow or white. *Calyx* short, 5-partite, eglandular. *Petals* 5, not clawed, spreading or reflexed, quite entire. *Stamens* 10, all perfect, filaments connate or distinct at the base. *Ovary* 3-lobed, lobes flattened at the back, sides winged; styles 3, glabrous, stigmas capitate. *Fruit* of 1–3 samaras; nucleus sometimes crested or winged at the back, and surrounded with a broad oblong or orbicular wing. *Seeds* oblong, subterete; embryo straight, cotyledons equal, radicle short.—Distrib. Species about 15; all tropical Asiatic.

* *Leaves glabrous beneath, or nearly so.*

1. **A. Roxburghiana,** *A. Juss. in Archiv. Mus. Hist. Nat.* iii. 511; shoots usually glabrous, inflorescence rusty-tomentose, leaves ovate or elliptic-ovate acuminate, midrib beneath glabrous or pubescent, ovary hairy, samara linear-oblong, nucleus not dorsally winged or keeled. Hiræa indica, *Roxb. Hort. Beng.* 90; *Fl. Ind.* ii. 448; *Cor. Pl.* ii. 160; *Wall. Pl. As. Rar.* i. 13. Aspidopteris oxyphylla, *A. Juss.* l.c. 510. Hiræa oxyphylla, *Wall. Cat.* 7264 (a more slender form).

Sikkim Himalaya, Mishmi and Khasia Mts., alt. 1–5000 ft.; Birma, Saluen river, *Wallich;* Western Peninsula, Carnatic, Orissa, and Concan.

A slender climber. *Leaves* 3–4 in., variable in breadth, acute or rounded at the base, undersurface when very young slightly pubescent, when old quite glabrous or the centre only; petiole ¼–½ in., glabrous or pubescent. *Panicles* effuse, rusty-tomentose. *Flowers* ⅙ in. diam. *Fruit* variable, much narrower in the Peninsular than in the Bengal specimens.—I have given the Bombay habitat on the authority of the Bombay Flora.

Var. 1. Samara 2 by ½ in. sides nearly parallel.—Western Peninsula.

Var. 2. Samara 1½–2 by ¾–1 in. more elliptic-oblong often narrowed either above or below. A. glabriuscula, *A. Juss. l.c.* 511; Hiræa glabriuscula, *Wall. Cat.* p. 260, 6626—Khasia Mts., Sikkim.

Var. 3. Leaves more rounded, samara 1¼ by ½–⅔ in.—Assam.

Jussieu describes the ovary of Var. 2 as glabrous, but it is clothed with deciduous hairs, as in all the vars. Wallich's Assam specimen under this name is referable to *A. nutans.*

2. **A. concava,** *A. Juss. in Archiv. Mus. Hist. Nat.* iii. 509; shoots glabrous, leaves ovate obtuse or obtusely-acuminate quite glabrous, buds rusty-tomentose, samaras orbicular very membranous transparent very concave, nucleus winged in the concavity. Hiræa concava, *Wall. Pl. As. Rar.* i. 13; *Cat.* 1061. H. Merguensis, *Wight Ill.* i. 139.

Birma, at Martaban, *Wallich;* Tenasserim, at Mergui, *Griffith.*

I have seen only imperfect specimens, Wallich's are in young bud only; Griffith's in old fruit. *Leaves* 3–4 in.; petiole quite glabrous. *Fruit* on very long capillary pedicels, 1–1½ in. diam., beautifully hyaline with radiating veins.—I do not observe the plication of the leaves described by Jussieu, who suspected that this was Blume's *elliptica;* but that is described as having much larger samaras, with a dorsal crest 6–7 lines long.

3. **A. canarensis,** *Dalz. in Hook. Kew Journ. Bot.* iii. 37; glabrous almost throughout, shoots stout woody, leaves ovate or elliptic-lanceolate obtusely acuminate, inflorescence reduced to axillary fascicles, ovary glabrate, samara suborbicular very membranous, nucleus with a dorsal wing. A. glomerata, *Wight Ic.* t. 1986.

Western Peninsula; Canara, *Dalzell;* Malabar and Mysore, *Wight.*

Branchlets flexuous, hard, with furrowed bark. *Leaves* 3–4 in., sometimes elliptic-obovate, base acute or rounded, rather coriaceous, pale; petiole ⅓ in. *Pedicels* slender, ½ in., glabrous, bracteolate towards the base, crowded on very short, simple or divided, pubescent axillary peduncles that are clothed with minute bracts. *Flowers* ¼ in. diam. *Samaras* 1¼–1½ in. diam., margin even or lobed towards the apex.—A very remarkable and distinct species.

** *Leaves hairy tomentose or pubescent beneath.*

4. **A. hirsuta,** *A. Juss. in Archiv. Mus. Nat. Hist.* iii. 512, t. 17; clothed with long spreading flaccid hairs, leaves broadly obovate or oblong or orbicular-obovate abruptly acuminate cordate at the very base, ovary glabrous, samaras linear-oblong, nucleus without dorsal crest or wing. Hiræa hirsuta, *Wall. Pl. As. Rar.* i. 13, t. 13; *Cat.* 1059.

BIRMA, on the Taong dong and the Prome Mts., *Wallich.*

Shoots very slender. *Leaves* 4–7 in., clothed on both surfaces with long soft hairs, membranous; petiole ¼ in. *Inflorescence* an open lax panicle, with regular opposite spreading branches; bracts at the base of the branches ½–¾ in., lanceolate; branches with many opposite bracteoles above the middle. *Flowers* ⅓ in. diam., subumbellate, glabrous, white. *Samaras* 1½–2 by ⅓–¾ in., sides almost parallel.

5. **A. cordata,** *A. Juss. in Archiv. Mus. Nat. Hist.* iii. 513; shoots inflorescence and leaves beneath clothed with white appressed tomentum, leaves orbicular-cordate with a broad acumen, panicle effuse, ovary villous, samaras orbicular or nearly so, nucleus not winged or keeled. Hiræa cordata, *Heyne in Wall. Cat.* 1060; *Wall. Pl. As. Rar.* i. 13. H. nutans, *Wall. Cat.* 1058, 2.

WESTERN PENINSULA; Concan, Canara, and Mysore.

A slender climber. *Leaves* 5–8 in. diam., the younger ovate-cordate, all rather abruptly terminated by a broad acuminate tip, opaque, and sometimes pubescent above; petiole 1–1½ in. *Inflorescence* a lax pendulous panicle, sometimes rusty; bracts at the branches filiform or 0, pedicels very variable. *Flowers* ½ in. diam. *Samaras* pale, 1–1½ in. diam., sometimes slightly oblong.

6. **A. nutans,** *Hook f.* (*not of A. Juss.*); young shoots and inflorescence tomentose, leaves ovate elliptic or orbicular with a broad based acumen base not cordate silkily pubescent beneath, panicle effuse, ovary villous, samaras oblong or suborbicular, nucleus not or rarely ridged or with a small wing at the base. A. Roxburghiana, *A. Juss. in part.* A. lanuginosa, *A. Juss. l.c.* 512. Hiræa nutans, *Roxb. Fl. Ind.* ii. 447 (*not of Wallich*). H. indica, *Wall. Cat.* 1057 *in part.* H. lanuginosa, *Wall. Cat.* 1058. *in part* (a very villous-leaved form, from Nepal).

NIPAL, *Wallich;* SIKKIM HIMALAYA, alt. 2000 ft., *J. D. H.;* EASTERN BENGAL, ASSAM, and CHITTAGONG, *Roxburgh*, &c.; BIRMA, at Bhamo, *T. Anderson.*

Very similar to *A. cordata*, but usually less tomentose, leaves even larger, attaining 10 in. diam., with often rusty tomentum on the nerves and rather thin long hairs between them; upper surface reticulate and rather shining; petiole of the larger leaves 2 in. *Samaras* 1½ by 1 in., usually oblong, sometimes almost orbicular.—Wallich says, under his *H. indica* (Cat. 1057), "An plus una species sub hac confusa;" and so it is, from wanting fruit of any of his specimens; five sheets thus named appertain to this species.

VAR. *rotundifolia;* leaves more villous beneath, samara with a small dorsal wing or crest. A. rotundifolia, *A. Juss. l.c.* 514; *Roxb. Fl. Ind.* ii. 448. Hiræa orbiculata, *Roxb. Hort. Beng.* 90; *Wall. Pl. As. Rar.* ii. 13.—Chittagong, *Roxburgh.*

7. **A. Wallichii,** *Hook. f.*; shoots slender, inflorescence and leaves beneath densely clothed with appressed more or less silky white tomentum, leaves ovate acute or acuminate base subcordate, panicle graceful effuse pendulous, ovary densely hispid with long white deciduous hairs, samaras orbicular-oblong, nucleus without crest or wing. A. nutans, *A. Juss. l.c.* 513. Hiræa nutans, *Wall. Pl. As. Rar.* i. 13; *Cat.* 1056, 1, *not of Roxburgh.* H. lanuginosa, *Wall. l.c.*; *Cat.* 1058 *in part.*

Western Tropical Himalaya; GARWHAL and KUMAON, ascending to 4500 ft., *Govan*, &c.

A tall climber; branches white. *Leaves* 4–7 in., base rounded, undersurface usually snow-white and silky, upper glabrous; petiole rarely ½ in. *Panicle* sometimes a foot long, white, lax, very graceful *Flowers* ⅓ in. diam.; pedicels rather stout, bracteoles most minute. *Samaras* 1⅓–1½ by 1–1⅓ in., variable in shape, sometimes narrowed at one end or emarginate.—It is not clear to what plant Wallich meant the name *lanuginosa* to apply; he has in his Herbarium two under that name, and both numbered 1058; of these, one from Govan, gathered, no doubt, in Kumaon, is identical with his own (not Roxburgh's) *Hiræa nutans;* the other, from Nipal, has a rusty tomentose panicle, and is probably the true *nutans* of Roxburgh; indeed he tickets it in mss. "prox nutanti, *Roxb.*" As Wallich's and Jussieu's *lanuginosa* is certainly not the very local and beautiful species here described, I have dedicated the latter to Dr. Wallich.

DOUBTFUL AND EXCLUDED SPECIES.

Imperfect specimen in young fruit of a plant from Poneshee in Birma, collected by Dr. J. Anderson. *Leaves* orbicular, coriaceous, densely rusty tomentose beneath. *Unripe samaras* oblong, with a dorsally winged nucleus.—Perhaps *A. tomentosa*, Juss., Java.

A Tenasserim or Andaman Island plant of Helfer, with orbicular leaves slightly cordate at the base, glabrous on both surfaces, except the costa beneath, which with the short petioles shoots and inflorescence are clothed with dense rusty tomentum. Samaras membranous, orbicular, not concave, retuse at the top, nucleus with a prominent dorsal wing. —Perhaps a form of *A. concava*, Juss.

HIRÆA FINLAYSONIANA, Wall. Cat. 7263, is a species of *Nelitris.*

ORDER XXXI. **ZYGOPHYLLEÆ.** (By M. P. Edgeworth, F.L.S., and J. D. Hooker.)

Herbs or shrubs, rarely trees, branches usually articulate. *Leaves* opposite or alternate by suppression, stipulate, 2–3-foliolate or pinnate; leaflets entire, not punctate; stipules twin, persistent, sometimes spiny. *Peduncles* usually 1–2 in the axils of the stipules, ebracteate rarely 2-bracteate. *Flowers* hermaphrodite, regular or irregular, white, red or yellow, very rarely blue. *Sepals* 5, rarely 4, free or rarely connate at the base, imbricate, rarely valvate. *Petals* 5–4, very rarely 0, hypogynous, free, imbricate or contorted, rarely valvate. *Disk* convex or depressed, rarely annular or 0, without glands. *Stamens* equal to or double or rarely three times as many as the petals, inserted at the base of the disk, often alternately longer, those opposite to the petals often connate at the base to the petals, filaments usually with a scale at the base or middle; anthers versatile, opening longitudinally. *Ovary* sessile or rarely stipitate on a short gynophore, furrowed angled or winged, 4–5- (rarely 2–12-) celled, cells very rarely with partial transverse septa, narrowing into a terminal angled or furrowed style; stigma simple, rarely discoid or stigmas 5; ovules 2 or more, rarely 1, usually filiform, pendulous or ascending, raphe ventral with a superior micropyle. *Fruit* never berried, coriaceous or crustaceous, either of 2–10 free or united often spiny cocci, or capsular and septicidally dehiscent. *Seeds* usually pendulous, solitary, rarely twin or more, oblong or linear, the raphe adnate or free; testa membranous crustaceous or thick and mucous; albumen scanty rarely 0; embryo the length of the seed, green, straight or rarely curved, cotyledons oblong or linear thick or foliaceous, radicle very short, straight, superior.—

DISTRIB. Genera, about 17, with 100 species, chiefly tropical and subtropical.

* *Seeds* exalbuminous.

Petals entire. Stamens 10. Fruit of usually spiny cocci. Leaves abruptly pinnate . . . . 1. TRIBULUS.

** *Seeds* albuminous.

Petals 0. Stamens 5. Leaves 3-foliolate . . . . 2. SEETZENIA.
Petals 4–5. Stamens 8–10. Ovules axile, superposed. Leaves 1–2-foliolate . . . . 3. ZYGOPHYLLUM.
Petals 5. Stamens 10. Ovules basal, collateral. Leaves 1–3-foliolate . . . . 4. FAGONIA.

(See PEGANUM in *Rutaceæ.*)

1. TRIBULUS, Linn.

Branching prostrate herbs, usually silky. *Leaves* stipulate, opposite, usually unequal, abruptly pinnate. *Flowers* solitary, on pseudo-axillary peduncles, white or yellow. *Sepals* 5, deciduous (or persistent) imbricate. *Petals* 5, fugacious, patent, imbricate. *Disk* annular, 10-lobed; stamens 10, inserted on the base of the disk, 5 longer opposite to the petals, 5 shorter with a little gland outside; filaments filiform, naked. *Ovary* sessile, hirsute, 5-12-lobed, 5–12-celled, cells opposite the petals; style short, pyramidal or filiform, stigmas 5–12; ovules superposed. *Fruit* 5-angled, of 5–12 winged or spinous or tuberculate indehiscent cocci. *Seeds* obliquely pendulous, testa membranous; embryo without albumen, cotyledons ovate, radicle short.—DISTRIB. A cosmopolitan genus of about 15 species.

1. **T. cistoides,** *Linn.; DC. Prodr.* i. 703; perennial, flowers 1–2 in. diam., peduncles equalling or exceeding the leaves, cocci 2–4-horned.

BENGAL, near Calcutta, *Edgeworth;* WESTERN PENINSULA, Madras, *Shuter*, &c.; Nilghiri Mts., *Foulkes;* Tenasserim at Mergui, *Wallich.*—DISTRIB. Throughout the Tropics.

Rootstock stout; branches 1–2 ft., procumbent or ascending, and leaves usually more silky than in the following. *Leaflets* often 7–8 pairs, subequal; stipules falcate, acuminate. *Sepals* $\frac{1}{4}$–$\frac{1}{3}$ in., acuminate, silky. *Petals* obovate. *Stigmatic lobes* shorter than the diameter of the style. *Cocci* tubercled and hairy, with usually 2 spines. *Seeds* separated by transverse septa.—Regarded as a large flowered form of *T. terrestris* by Oliver (Fl. Trop. Afr. i. 284).

2. **T. terrestris,** *Linn.; DC. Prodr.* i. 703; annual or biennial, flowers $\frac{1}{3}$–$\frac{3}{4}$ in. diam., peduncles shorter than the leaves, cocci with 2 long and 2 short spines. *Dalz. & Gibs. Fl. Bomb.* 45. T. lanuginosus, *Linn.; DC. l.c.; W. & A. Prodr.* 145; *Wall. Cat.* 6854; *Wight Ic.* t. 98; *Ill.* i. 164; *Boiss. Fl. Orient.* i. 902.—*Burm. Fl. Zeyl.* 265, t. 106, f. 1.

Throughout INDIA, ascending to 11,000 ft. in WESTERN TIBET; northern part of CEYLON.—DISTRIB. Throughout the warm regions of the globe.

Prostrate, hirsute or silky hairy; branches 1–2 ft. *Leaflets* 5–7 pairs, subequal, mucronate. *Petals* often not exceeding the calyx. *Cocci* very variable, glabrous or hairy, mucronate, much as in *T. cistoides.* *Stigmatic lobes* longer than the diameter of the style.

3. **T. alatus,** *Delile; DC. Prodr.* i. 703; annual, flowers $\frac{1}{3}$–$\frac{1}{2}$ in. diam., peduncles shorter than the leaves, cocci broadly winged.—*Boiss. Fl. Orient.* i. 902.

SINDH, *Stocks*, *Vicary*; PANJAB, at Multan, *Edgeworth*.—DISTRIB. Egypt, Arabia, Nubia.

Hispid and villous; branches procumbent or ascending. *Leaflets* 5 pairs, subacute; stipules ovate, acute. *Petals* about equalling the sepals. *Stamens* 5 or 10. *Fruit* broadly pyramidal, somewhat pointed; cocci hirsute, 2-seeded, the spines confluent into toothed wings.—Fruit slightly bitter, eaten by the desert nomads in Multan.

2. **SEETZENIA,** *Br.*

A small prostrate glaucous herb, woody at the base, glabrous or woolly. *Leaves* opposite, 3-foliolate; leaflets obovate, apiculate. *Peduncles* axillary, 1-flowered. *Flowers* small. *Sepals* 5, linear-oblong, valvate, incurved at the top. *Petals* 0. *Disk* small, 5-lobed. *Stamens* 5, inserted on the disk, filaments filiform glabrous naked at the base; anthers nearly globose. *Ovary* oblong-clavate, sessile, pentagonal, truncate, fleshy, 5-celled; styles 5, short, spreading, stigmas small capitate; ovules solitary in each cell, pendulous. *Fruit* ovoid, of 5 1-seeded cocci, separating from the persistent axis, with a narrow succulent exocarp on the back only, endocarp crustaceous. *Seeds* oval, compressed, testa thick with three skins, the outer membranous, the middle one cellular and mucous, the inner coriaceous, albumen thin; cotyledons thickish.

1. **S. orientalis,** *Dcne. in Ann. Sc. Nat. ser.* 2, iii. 280, t. 7; *Boiss. Fl. Orient.* i. 916.

SINDH, *Stocks*, *Vicary*.—DISTRIB. Arabia, N. and S. Africa.

Branches long and slender, smooth or papillose. *Leaflets* fleshy, ¼–½ in. long, middle one obovate-cuneate, lateral oblique; stipules triangular. *Peduncle* ⅙–½ in., more or less recurved at the tip, longer than the petiole. *Fruit* ellipsoid, ovoid or subglobose, ¼–⅓ in. long, pendulous. *Seeds* fusiform, smooth.

3. **ZYGOPHYLLUM,** *Linn.*

Small shrubs or prostrate herbs. *Leaves* opposite, 1- or 2-foliolate, fleshy; stipules 2, often spiny. *Peduncles* 1- or 2-flowered, among the stipules. *Flower* white, or yellow with red or purple spots at the base. *Calyx* 4–5-partite, persistent or deciduous, imbricate. *Petals* 4–5, clawed, imbricate and contorted. *Disk* fleshy, angled, cup-shaped or concave. *Stamens* 8–10, inserted on the disk, longer than the petals, filaments filiform with a scale at the base; anthers oblong. *Ovary* sessile upon the disk, 4–5-cornered, 4–5- (rarely 2–3-) celled, tapering into an angled style, stigma small; ovules 2–∞, superposed, raphe free or adnate. *Fruit* capsular, 4–5-cornered or winged, indehiscent or septicidally dehiscent into 5 cocci, or loculicidally 5-valved, the endocarp sometimes separating. *Seeds* 1 or many in each cell, pendulous, testa crustaceous, albumen scanty; cotyledons oblong.—DISTRIB. Upwards of 50 species, natives of the Old World, and chiefly Cape and Australian.

1. **Z. simplex,** *Linn.*; *DC. Prodr.* i. 705; annual, leaves simple cylindric.—*Boiss. Fl. Orient.* i. 912.

Sandy deserts; SINDH, *Stocks*, *Vicary*; PANJAB, at Multan, *Edgeworth*.—DISTRIB. Arabia, tropical Africa.

A prostrate glabrous slender much branched herb. *Leaves* small, sessile, fleshy, obtuse; stipules lanceolate, acute. *Peduncle* as long as the obovate cucullate sepals. *Petals* spathulate. *Scales* 2-partite. *Capsule* deflexed, turbinate, rough, of 5-compressed 2–3-seeded cocci. *Seeds* fusiform, smooth.—The seeds are swept up by the nomad tribes of the Multan desert, and eaten under the name of Alathi.

2. **Z. coccineum,** *Linn.; DC. Prodr.* i. 706; perennial, leaves 2-foliolate. *Boiss. Fl. Orient.* i. 915.

Rocky ground in SINDH, *Stocks, Vicary.*—DISTRIB. Syria, Arabia, Egypt.

Stem shrubby below, with erect or ascending hoary at length glabrous branches. *Leaves* petioled; leaflets terete, grooved or semiterete, minutely powdery; stipules triangular, scarious. *Peduncle* equalling the petiole. *Sepals* ovate, cucullate, fleshy, shorter than the spathulate white undulate petals. *Scales* lanceolate, entire or torn. *Capsule* erect, grooved, cylindric-ovoid, truncate. *Seeds* small, ovoid, tubercled, acute, compressed.—The flowers open in the middle of the day.

4. FAGONIA, Linn.

Branching woody herbs. *Leaves* opposite, 1–3-foliolate, entire, mucronate; stipules usually spiny. *Peduncle* solitary from between the stipules. *Sepals* 5, deciduous, imbricate. *Petals* 5, closed, caducous, imbricate. *Disk* short, inconspicuous. *Stamens* 10, inserted on the disk, filaments filiform, naked; anthers oblong. *Ovary* sessile, 5-cornered, 5-celled, tapering into a subulate style, stigma simple; ovules 2, collateral at the base of each cell, pendulous from ascending funicles. *Fruit* 5-cornered, of 5 1-seeded cocci which dehisce along the ventral suture and separate from a horny endocarp. *Seeds* erect, compressed, broadly oblong, testa mucilaginous, albumen horny; cotyledons broad, flat, ovate.—DISTRIB. Species variously estimated from 2 or 3 to 30, being very variable and difficult to define.

1. **F. arabica,** *Linn.; DC. Prodr.* i. 704; glandular, young branches terete striate, spines exceeding the linear leaflets. *Boiss. Fl. Orient.* i. 907. F. mysorensis, *Roth.; DC. l.c.; Wall. Cat.* 6853; *W. & A. Prodr.* 145; *Dalz. & Gibs. Bomb. Flor.* 45; *Wight Ill.* i. t. 64. F. cretica *var.* arabica, *T. Anders. in Journ. Linn. Soc.* v. *Suppl.* i. 12; *Oliver Fl. Trop. Afric.* i. 287.

Throughout NORTH WESTERN INDIA, SINDH, the PANJAB, and the southern provinces of the WESTERN PENINSULA.—DISTRIB. Westward to Egypt.

A small green spiny undershrub, with erect branches, more or less glandular. *Leaves* 1–3-foliolate; leaflets elliptic or linear, acute; petiole often foliaceous. *Flowers* small, pale rose-coloured. *Sepals* oblong-lanceolate, half as long as the petals. *Capsule* pubescent, about as long as the recurved peduncle. *Seeds* punctulate.

2. **F. Bruguieri,** *DC. Prodr.* i. 704; glandular, young branches subtetragonous sides grooved, spines exceeding the ovate rather fleshy leaflets. *Boiss. Fl. Orient.* i. 905. F. Echinella, *Boiss. Diagn. ser.* 1, viii. 123. F. cretica *var. T. Anders. in Journ. Linn. Soc.* v. *Suppl.* i. 12.

NORTH-WEST INDIA; Peshawur, *Herb. Falconer, Stewart;* Chandnist, *Edgeworth.*—DISTRIB. Westward to Algeria.

Similar to *F. arabica*, and like it referable by many authors to a variety of *F. cretica*. *Internodes* short; branches procumbent. *Lower leaves* 3-foliolate, the rest 1-foliolate; leaflets minute.—The form distinguished as *Echinella* by Boissier, has crowded decussate branches, and very short leaves.

EXCLUDED SPECIES.

FAGONIA MONTANA, Miq.; see Fl. Ind. Bat. i. pt. 2, 596, is *Monetia tetracantha*.

ORDER XXXII. **GERANIACEÆ.** (By M. P. Edgeworth, F.L.S., and J. D. Hooker.)

Herbs, undershrubs, or rarely trees; glabrous or more usually pubescent and glandular. *Leaves* opposite or alternate, usually 2-stipulate. *Peduncles* usually solitary and axillary, 1- or more-flowered. *Flowers* umbelled cymose or racemose, usually showy, hermaphrodite, regular or irregular. *Sepals* 5, rarely 4 or 2, free or united to the middle, imbricate or rarely valvate, the posticous sometimes spurred. *Petals* as many as the sepals or fewer by suppression, or 0, hypogynous or subperigynous, variously imbricated, rarely contorted. *Torus* scarcely expanded into a disk with 5 glands alternating with the petals, or without glands, raised in the centre into a beak, rarely flat. *Stamens* as many as or double or treble the sepals, or fewer by suppression; filaments filiform or dilated, or connate into a ring; anthers 2-celled, cells parallel, opening lengthwise. *Ovary* 3–5-lobed, 3–5-celled, rarely 2-lobed, of 3–5 carpels united with the axis as far as the insertion of the ovules, sometimes lengthened into a beak-bearing style, or styles which are free or more or less united, stigmas capitate linear or ligulate; ovules 1 or 2 or rarely more, horizontal or pendulous or ascending. *Fruit* capsular, 3–5-lobed, lobes 1-seeded often separating from the axis septicidal or loculicidal rarely berried. *Seeds* pendulous or horizontal, albumen 0 or scanty or fleshy; embryo straight or curved, cotyledons flat convex or variously folded foliaceous or thick or fleshy, radicle either short and near the hilum or longer and inflected or incumbent on the cotyledons.—DISTRIB. Genera 20, with about 800 species, chiefly found in temperate climates.

Besides the genera described below, *Pelargonium* (the garden so called *Geranium*) is cultivated throughout India, and one species of Natal (P. grossularioides, *DC.*; Erodium nilagiricum, *Schlecht. Pl. Ind. Or. exsicc.* 1560), is naturalized in the Nilghiris. The genus is distinguished by the posticous sepal being produced into a spur which is adnate to the pedicel and by some of the filaments being antherless.

TRIBE 1. **Geranieæ.** *Leaves* simple or compound. *Flowers* regular or nearly so. *Sepals* imbricate. *Glands* alternate with the petals. *Antheriferous stamens* as many or double or treble the number of petals.

Carpels indehiscent; not beaked. Ovules solitary.	
Stamens 10, all perfect	1. BIEBERSTEINIA.
Carpels beaked, dehiscent. Ovules geminate.	
Perfect stamens 15, pentadelphous	2. MONSONIA.
Perfect stamens 10, rarely fewer	3. GERANIUM.
Perfect stamens 5, staminodes 5	4. ERODIUM.

TRIBE 2. **Oxalideæ.** *Leaves* compound. *Flowers* regular. *Sepals* imbricate. *Glands* 0. *Stigmas* capitate. *Ovules* 2 or more.

* *Herbs. Fruit capsular.*

Stamens 10. Capsule loculicidal, valves cohering with the axis. Leaves 3–∞-foliate	5. OXALIS.
Stamens 10. Capsule loculicidal, valves usually separating from the axis to the base. Leaves pinnate	6. BIOPHYTUM.

** *Trees or shrubs. Fruit berried.*

Stamens 10, or 5 and 5 staminodes. Ovules many. Leaves pinnate	6.* AVERRHOA.
Stamens 10. Ovules in pairs. Leaves 1–3-foliolate	7. CONNAROPSIS.

TRIBE 3. **Balsamineæ.** *Leaves* simple. *Flowers* irregular. *Sepals* usually coloured, the posticous spurred. *Stamens* 5, very short. *Anthers* subconnate.

Lateral petals connate in pairs. Fruit capsular	8. IMPATIENS.
Lateral petals free. Drupe fleshy	9. HYDROCERA.

1. BIEBERSTEINIA, Stephan.

Perennial glandular herbs. *Leaves* stipulate, pinnatisect. *Flowers* regular, racemose or panicled. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate, alternating with 5 glands. *Stamens* 10, all bearing anthers, filaments united into a ring at the base. *Ovary* deeply 5-lobed, 5-celled; styles distinct, arising from the bases of the lobes, connate into a capitate stigma; ovules solitary in the cells, pendulous from below the top of the cell. *Ripe carpels* separating from a persistent 5-lobed axis, indehiscent, crustaceous, wrinkled. *Seeds* incurved on one side of the fleshy albumen; embryo arched, cotyledons thick.—DISTRIB. Several species, natives of Asia, Siberia, Greece, the Altai Mountains, and Tibet.

1. **B. emodi,** *Jaub. & Spach. Ill. Pl. Or.* ii. 109; leaves pinnatisect lobes pinnatifid, stipules adnate laciniate, bracts oblong or obovate lobed, petals entire. B. odora, *Royle Ill.* 153, t. 30, *not of Stephan.*

ALPINE WESTERN TIBET and KUNAWAR alt. 14–17,000 ft., *Jacquemont*, &c.

Glandular-pubescent. *Rootstocks* densely tufted, branched, tuberous, giving off crowns of leaves and short simple flowering stems a few inches high. *Leaves* linear, with many pairs of small broad irregularly lobed leaflets; stem leaves small. *Flowers* racemose, ½ in. diam., yellow; pedicels equalling the calyx, 2-bracteolate. *Sepals* elliptic-oblong, pubescent. *Petals* nearly orbicular. *Filaments* hairy. *Styles* slender. —The aspect, and in many respects the structure, of this plant is singularly Rosaceous, and like a *Potentilla.*

2. MONSONIA, Linn.

Herbs or undershrubs. *Leaves* opposite or alternate, stipulate. *Peduncles* axillary, bracteate. *Flowers* solitary or umbelled. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate, alternate with 5 small glands. *Stamens* 15, all bearing anthers, shortly monadelphous, 5 of them opposite the petals. *Ovary* 5-lobed, 5-celled, beaked; beak ending in the style, bearing 5 linear branches inwardly stigmatose; ovules 2, superposed in each cell. *Capsule* with a very long beak of 5 1-seeded carpels; carpels with 5 elastic tails which are bearded on the inner side, and separate from the beak. *Seeds* exalbuminous; embryo incumbent on the convolutely folded cotyledons.—DISTRIB. South Africa; genera of about a dozen species, besides 4 or 5 North African species and the present.

1. **M. senegalensis,** *Guill. & Perr. Fl. Senegamb.* i. 131; viscid, leaves ovate or cordate, peduncles rarely 2-flowered, beak of carpels very long setose on the inner face. *Boiss. Fl. Orient.* i. 898. M. Lawiana, *Stocks in Calcutta Journ. Nat. Hist.* vii. 19. M. Chumbalensis, *Wight Ic. in text* t. 1074. Erodium Chumbalense, *Munro in text Wight Ic.* t. 1074. ? Geranium Lawianum, *Graham Cat. Bomb. Pl. Supplemental page.*

SINDH, *Stocks;* UPPER GANGETIC PLAIN near AGRA, *Munro;* the DEKKAN, common in dry pastures, *Gibson,* &c.—DISTRIB. Beluchistan, Arabia, and westwards to Senegambia and Namaqualand.

A diffuse annual herb or undershrub; branches pubescent and glandular. *Leaves* ¾–1½ in., long-petioled, obtuse or mucronate, repand-toothed, glabrate above, pilose and pubescent beneath; stipules subulate. *Peduncles* long, sharply deflexed at the bracteoles. *Sepals* obovate, awned, densely pubescent with long hairs. *Petals* violet or pink, 3-veined, crumpled, scarcely exceeding the sepals. *Filaments* ciliate. *Carpels* acute, stipitate, obliquely truncate with 2–3 wrinkles at the top, roughly hairy; beak 3 in.

2. **M. heliotropioides,** *Cav.; Boiss. Fl. Orient.* i. 897; annual or perennial, leaves petioled ovate ovate-cordate or rhomboid minutely toothed, sometimes obscurely lobed hoary above villous beneath, petiole and scape clothed with very long white deciduous hairs, sepals silky or hoary mucronate. M. mallica, *Edgw. in Jour. Linn. Soc.* vi. 200.

PANJAB; Moultan, *Edgeworth;* beyond the Indus in Waziristan, *Stewart;* SINDH, in the Hill range, *Vicary.*—DISTRIB. Westwards to Egypt.

A small white annual herb, or with a well-developed woody rootstock. *Leaves* ½–1 in. long, chiefly radical, very variable in shape, coriaceous, densely silky and villous beneath; petiole longer than the blade. *Scapes* 2–8 in., erect, slender. *Flowers* ¼–⅓ in. diam., umbelled. *Sepals* oblong, at length obovate and enlarged in fruit. *Petals* obovate-spathulate, not exceeding the sepals. *Stamens* 15, slightly 5-adelphous at the base. *Fruit* 3 in.; carpels narrow, stipitate, hairy, keeled, with two transverse wrinkles at the top.—The Indian specimens are usually but not always annual, and never so large as the Persian and Arabian specimens. The structure of the fruit is identical with that of *Erodium stipaceum*, but the stamens are very different.

3. GERANIUM, Linn.

Herbs or undershrubs. *Leaves* opposite or alternate, stipulate. *Peduncles* axillary, bracteate, 1–2-flowered, or pedicels umbelled. *Flowers* regular. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate, alternating with 5 glands. *Stamens* 10, usually all anther-bearing, rarely 5 without anthers, free or shortly monodelphous. *Ovary* 5-lobed, 5-celled, beaked; styles 5, stigmatose longitudinally, ovules superposed. *Capsule* 5-lobed, 5-celled, cells 1-seeded, carpels usually dehiscent ventrally, often separating septifragally from the axis, their beaks elastically coiling upwards from the base to the apex of the axis. *Seeds* with scanty albumen or 0; embryo with the cotyledons induplicate or convolute incumbent.—DISTRIB. Species about 100, natives chiefly of cold temperate regions in the Northern Hemisphere; they are very difficult of discrimination.

SECT. 1.—*Peduncles* axillary and terminal, solitary, 2-flowered. *Flower-buds* oblong or ovoid, not pyramidal. *Sepals* not dilated or subcordate at the base. *Carpels*, with their beaks separating elastically from the axis, not wrinkled.—Rootstock stout, perennial.

* Flowers large, an inch or upwards in diameter.

† *Petals reflexed.*

1. **G. refractum,** *Edgew. & Hook. f.;* tall, stout, branched, glandular-hairy, leaves 5–7-partite segments obtuse deeply lobed and cut, stipules large, bracts linear very slender, sepals shortly awned, petals reflected, filaments nearly glabrous.

SIKKIM HIMALAYA; Tungu, alt. 12–13,000 ft., *J. D. H.*

Stems 2–4 feet, erect. *Leaves* 3 in. diam., shortly pubescent on both surfaces; lower petioles long; stipules ½ in., broadly oblong, ovate or obtuse. *Peduncle* and refracted *pedicels* long, clothed with spreading hairs. *Sepals* ½ in., membranous, glandular-hairy, margins broad, awn stout. *Petals* twice as long as the sepals, linear-oblong, obtuse, white, 5-nerved, villous on each side at the base. *Filaments* gradually narrowed upwards. *Ovary* tomentose. *Fruit* not seen.—A very curious species, allied to the N. American *G. Richardsoni.*

†† *Petals spreading.*

2. **G. pratense,** *Linn.; DC. Prodr.* i. 641; stout, erect, branched, hairs spreading, leaves orbicular 7–9-partite segments acute incised, stipules subulate-lanceolate, pedicels glandular-hairy, sepals long-awned, bracts subulate, filaments ciliate. *Boiss. Fl. Orient.* i. 877. G. himalayense, *Klotzsch in Reise Prinz. Waldem.* 116, t. 122; *Walp. Ann.* vii. 485.

WESTERN TEMPERATE HIMALAYA; Kashmir, *Falconer;* Kulhara in GARWHAL, alt. 10,500 ft., *Strach. & Winter.;* PITI, alt. 7–8000 ft., *T. Thomson;* WESTERN TIBET; Sákh river, alt. 14,000 ft., *Strach. & Winter.*—DISTRIB. N. Asia, and westwards to Europe.

Stem 2–4 ft. high, usually stout, hairs on branches and petioles often reflexed. *Leaves* 2–3 in. diam., variously cut; stipules usually small. *Peduncles* and refracted *pedicels* densely hairy and glandular; bracts small and slender. *Flowers* 1½–2 in. diam., blue-purple. *Petals* entire or notched, ciliate at the base. *Filaments* gradually narrowed upwards. *Carpels* glandular-hairy. *Seeds* reticulate.

3. **G. rectum,** *Trautv.; Walp. Ann.* vii. 485; very slender, tall, subsimple, sparingly leafy and hairy, leaves opposite 5-angled 7-lobed to below the middle membranous segments rhomboid acute and acutely incised, stipules subulate-lanceolate, peduncles, very long and slenderly appressed-pubescent, bracts subulate, sepals long awned, filaments ciliate.

KASHMIR, *Falconer;* in Baltal, *T Thomson.*—DISTRIB. Soongaria.

Stem 2 feet, very slender, apparently ribbed, almost glabrous. *Leaves* 3–4 in. diam., membranous, sparingly pilose on both surfaces, radical petioles very long and slender. *Peduncles* sometimes 8 in.; pedicels very variable; bracts subulate. *Flower* 1¼ in. diam. *Sepals* membranous, glabrate, narrow-oblong with a stout awn. *Petals* obovate, retuse, ciliate at the very base. *Filaments* gradually narrowed upwards. *Carpels* (not seen in Indian specimens) smooth, appressed-pubescent. *Seeds* smooth.—Siberian (Alatau Mts.) specimens are described as having erect fruiting peduncles and presenting two varieties, one glabrous, the other villous with white hairs. It differs from *G. nodosum* in the stems not being swollen at the nodes and in the entire petals. Falconer's is a single rather doubtful specimen, mixed with *G. Wallichianum.*

4. **G. aconitifolium,** *L'Herit.; DC. Prodr.* i. 642; very slender, sparingly pubescent, much branched, leaves deeply 3–9-partite segments acute deeply laciniate or pinnatifid upper sessile, stipules small subulate, pedicels and long-awned sepals usually glandular hairy, filaments ciliate.

WESTERN TIBET, *Falconer* (*Kew Distrib.* 328).—DISTRIB. Alps of Switzerland and N. Italy.

Stems slender, 1–2 ft., very sparingly hairy. *Leaves* 2–2½ in. diam.; segments narrow, acute or obtuse; upper leaves sessile with the radiating lobes giving a peculiar appearance to the plant. *Peduncles* variable in length, pedicels usually clothed with spreading glandular hairs, but sometimes merely pubescent; bracts subulate, very slender. *Flowers* smaller than in the other species of this group, 1–1¼ in. diam. *Sepals* rather broad. *Petals* obovate, rounded at the tip, glabrous. *Filaments* suddenly dilated at the base. *Fruit* 1 in., nearly glabrous. *Seeds* smooth, opaque.—Apparently the same as the European species, in which the peduncles and pedicel and calyx are eglandular, which is rarely the case in the Tibetan specimens.

5. **G. collinum,** *M. Bieb.; DC. Prodr.* i. 642; stem usually short hoary or glandular pubescent, leaves orbicular 5–7-lobed to below the middle

segments cuneate obtusely 3–5-lobed, stipules small ovate acute, pedicels appressed-pubescent or glandular-hairy, sepals shortly awned, filaments ciliate at the base. *Boiss. Fl. Orient.* i. 874. G. multifidum, *Don Prodr.* 207. G. Donianum, *Wall. Cat.* 8565; *Sweet Geran. sub tab.* 338.

WESTERN TIBET, ZANSKAR, PITI, and KUNAWER, alt. 12–14,000 ft., *Jacquemont*, &c.; KASHMIR, *Falconer;* NIPAL, *Wallich;* GARWHAL, 9–11,000 ft., *Edgeworth;* inner valleys of SIKKIM HIMALAYA, *J. D. H.*—DISTRIB. Affghanistan, Siberia, S. Russia.

In its common Tibetan form this is a short hoary-pubescent or glandular species, with many subsimple flowering stems, 6–10 in. high, orbicular (not angled) leaves, with obtusely cut often slender lobes, slender peduncles and pedicels, and large flowers. —Affghanistan specimens are taller, more slender, and branched.

6. **G. ?palustre,** *Linn.; DC. Prodr.* i. 642; rather tall, pubescent or hairy, leaves pentagonal palmately 5-lobed lobes rhomboid acute pennatifidly incised, stipules subulate-lanceolate, peduncles long glandular-hairy, sepals awned, petals obovate rounded at the tip. *Boiss. Fl. Orient.* i. 874. G. grandiflorum, *Edgew. in Trans. Linn. Soc.* xx. 42.

KASHMIR, *Falconer;* KUMAON, at Mana, alt. 9–11,000 ft., *Edgeworth.*—DISTRIB. Siberia, Caucasus, Mid. and N. Europe.

Very similar to large states of *G. collinum*, but the flowers are larger, nearly 2 in. diam., and leaves pentagonal in outline from their segments being more produced. The identification with *G. palustre* is doubtful.

7. **G. Wallichianum,** *Sweet Geran.* t. 90; *DC. Prodr.* i. 641; tall, robust, much branched, leaves 5-gonal deeply 3–5-lobed segments rhomboid acuminate incised, stipules very large broadly oblong or almost rounded obtuse, bracts large, pedicels long, sepals long-awned, filaments ciliate at the base. *Wight Ic.* t. 324; *Wall. Cat.* 8558; *Don Prodr.* 208.

TEMPERATE HIMALAYA, alt. 7–11,000 ft., from Nipal, *Wallich*, to Marri, *Fleming.*

More or less pilose or villous with spreading or reflexed hairs, which are rarely glandular. *Leaves* 3–4 in. broad, segments acutely cut; stipules ½–1 in. long, very broad. *Bracts* usually 4, linear-oblong, ½ in. long, obtuse, acute or acuminate. *Flowers* 1½–2 in. diam. *Petals* obovate, retuse. *Filaments* suddenly dilated at the base. *Carpels* pilose. *Seeds* smooth.—The very large solitary stipules best distinguish this species.

8. **G. Grevilleanum,** *Wall. Cat.* 8559; *Pl. As. Rar.* iii. t. 209; robust or slender, hairy and glandular, branched, leaves 5-gonal 5–7-lobed below the middle segments rhomboid acute or acuminate incised, stipules 2-fid or in pairs ovate acuminate, pedicels long slender, sepals long-awned, filaments villous with long hairs. G. eriostemon, *Don Prodr.* 208, *not of Fischer.* ? G. Lamberti, *Sweet Geran.* t. 338 G. Backhousianum, *Regel. Descript. Plant. Nov.* 1873, 32.

TEMPERATE HIMALAYA, alt. 8–11,000 ft, from KUMAON to SIKKIM.

A tall branched species, resembling *G. Wallichianum*, but distinguished by the bifid or bipartite stipules and very villous filaments; it varies much in pubescence and glandular often reflexed hairs, being sometimes almost villous or velvety. *Peduncles* and *pedicels* slender, clothed with spreading glandular hairs; bracts linear, slender. *Flowers* 1–1½ in. diam. *Petals* obovate, tip rounded or retuse, hairy at the base, rose-coloured, or very pale with a purplish eye (in Sikkim specimens). *Filaments* gradually narrowed upwards. *Carpels* pilose. *Seeds* smooth.

** Flowers less than an inch in diameter (see also 14, *G. rotundifolium*).

9. **G. nepalense,** *Sweet Geran.* t. 12; slender, diffuse, much branched, hairy or villous, eglandular, leaves 5-gonal deeply 3–5-lobed or -partite upper sessile segments rhomboid incised, stipules subulate-lanceolate, peduncles slender 1–2-fid, sepals shortly awned almost equalling the entire

petals. *Don Prodr.* 208. G. radicans, *DC. Prodr.* i. 639. G. pallidum *and* G. patens, *Royle Herb.*; *Wall. Cat.* 8560, 8561. G. affine, *W. & A. Prodr.* 133 (*not of Ledebour*) *Wight Ill.* i. 153, t. 59 (*colour of flower wrong ?*). G. Arnottianum, *Steud. Nomen.* 677.

Throughout the Temperate Himalayas, alt. 5–9000 ft.; the Khasia, Nilghiri and Pulney Mts., and in the higher parts of Ceylon.—Distrib. Yunan.

Branches sometimes rooting (*G. radicans*, DC.), more or less clóthed with spreading or reflexed hairs. *Leaves* 1½–2½ in. diam., opposite, spreading. *Peduncles* usually slender, sometimes 1-flowered, very variable in length, spreading, reflexed after flowering. *Flowers* ⅓–⅔ in. diam., pink or purple. *Sepals* usually silky. *Carpels* hairy. *Seeds* shining, smooth.—We find no difference between the Himalayan and Peninsular specimens. The Javanese *G. ardjunense*, Zoll., may, from the description, prove to be this.

10. **G. sibiricum,** *Linn.*; *DC. Prodr.* i. 639; prostrate, slender, excessively branched, hoary, leaves 5-gonal 5-partite segments rhomboid acute acutely incised, stipules subulate, peduncles slender 1–2-flowered, sepals long-awned, equalling or exceeding the notched petals. *Boiss. Fl. Orient.* i. 879.

Western Tibet, Nubra and Ladak, alt. 10–12,000 ft. *Thomson.*—Distrib. Siberia, Dahuria, Caucasus, Germany.

Very similar at first sight to *G. nepalense*, but more flaccid and branched, with the upper leaves all petioled, and shorter notched petals.—Thomson's specimens are the only Indian ones we have seen.

Sect. 2. *Pedicels* crowded amongst the uppermost leaves, subumbellate. *Flower-buds* ovoid or oblong, not pyramidal. *Carpels* wrinkled, becoming detached from their beaks which coil upwards elastically.—Rootstock stout, perennial.

11. **G. polyanthes,** *Edgew. & Hook. f.*; sparingly hairy, slender, flowering-stems naked below, leaves orbicular-reniform 7–9-partite or lobed segments cuneate obtuse 3–7-fid, pedicels short, sepals shortly awned, filaments ciliate. *Wall. Cat.* 8564. G. Donianum, *Herb. Ind. Or. H. f. & T. not of Sweet.*

Temperate Himalaya, Kumaon, *Blinkworth*; Inner valleys of Sikkim, alt. 9–12,000 ft., in grassy places, *J. D. Hooker.*

A very singular species, with subsimple stems 6–10 in. high, bearing clusters of flowers amongst the uppermost involucre-like leaves. *Flowering-stems* simple or umbellately branched about the middle. *Leaves* 1½–2 in. diam., more or less pilose; petiole of radical very long, upper sessile and crowded under the pedicels; stipules variable, ovate acuminate or subulate-lanceolate. *Umbels* 3–10-flowered; pedicels ¼–1 in., glandular-hairy, as are the sepals. *Flowers* ½–¾ in. diam., dark-purple. *Fruit* erect, 1 in. long. *Carpels* laterally compressed, keeled, strongly reticulate, glabrous; beaks slender; styles very short. *Seeds* smooth.

Sect. 3. *Peduncles* 2- or more-flowered, crowded. *Flower-buds* ovoid or oblong, not pyramidal. *Carpels* smooth, their beaks remaining attached to the axis (not always in *G. rotundifolium*).

* *Rootstock perennial, flowers large.*

12. **G. Tuberaria,** *Camb. in Jacq. Voy. Bot.* 33, t. 37; slender, erect, hairy and glandular, leaves orbicular-reniform 5–7-partite, segments pinnatifid, petiole very slender, peduncles 2-flowered terminal umbelled or fascicled very hairy and glandular, sepals obtuse awned or apiculate very hairy, petals retuse, filaments ciliate with very long hairs. *Walp. Rep.* 449.

Temperate Western Himalayas, KASHMIR, *Jacquemont;* KISHTWAR, alt. 8000 ft., *T. Thomson.*

Rootstock tuberous. *Flowering stems* 12–18 in. high, slender, simple or subumbellately branched. *Leaves* 1½–3 in. diam., segments very spreading, radical on very long slender petioles; stipules variable. *Inflorescence* subumbelled, with an involucre of shortly petioled leaves: peduncles and pedicels erect, clothed with long spreading glandular hairs; bracts leafy, pinnatifid. *Flowers* 1 in. diam. *Sepals* elliptic, small, obtuse, apiculate, narrowly margined. *Petals* large, obcordate, ciliate at the very base. *Filaments* very slender throughout their length. *Fruit* 1¼–1½ in., erect, hairy; carpels not wrinkled; styles very short. *Seeds* smooth.—There is no trace of the beaks being separable from the axis, though the valves are removable.—A very curious species.

** *Annual, flowers small, in axillary peduncles, fruiting pedicels deflexed.*

13. **G. pusillum,** *Linn.; DC. Prodr.* i. 642; prostrate, very slender, much branched, pubescent, leaves reniform-orbicular deeply 5–9-lobed or partite segments cuneate 3-lobed, petals obcordate scarcely exceeding the mucronate sepals, carpels smooth, seeds smooth. *Boiss. Fl. Orient.* i. 881.

Western Temperate Himalaya; KASHMIR, *Falconer;* KISHTWAR, alt. 8000 ft., *J. Thomson.*—DISTRIB. Syria and throughout Europe.

Very slender and much branched, leafy, slightly glandular above. *Leaves* ½–1 in. diam; stipules short. *Flowers* ¼ in. diam., blue-purple, very small. *Petals* and *Filaments* ciliate at the base. *Fruit* ⅓ in. long. *Carpels* smooth, hairy. *Seeds* very minutely granulate.

14. **G. rotundifolium,** *Linn.; DC. Prodr.* i. 643; suberect with very slender spreading branches, glandular-hairy, leaves reniform 7-fid segments broad obtusely lobulate, petals cuneate entire exceeding the calyx, carpels smooth, seeds deeply pitted. *Boiss. Fl. Orient* i. 880. G. potentilloides, *Klotzsch in Reise Pr. Waldem.* 123, t. 17.

PANJAB at Peshawar, *Vicary;* and Hooshiarpore, *Aitcheson;* WESTERN TEMPERATE HIMALAYA, alt. 6-9000 ft.; Kashmir, *Falconer;* Jamu, *Thomson;* Garwhal, alt. 2000 ft., *Strach. & Winter.*—DISTRIB. Siberia and Eastward to Europe and N. Africa.

Very slender. *Leaves* ½–1½ in. diam.; petioles very slender. *Flowers* ⅓ in. diam. *Petals* red, glabrous. *Fruit* ⅔ in. long.

15. **G. molle,** *Linn.; DC. Prodr.* i. 643; stems rather stout diffuse or ascending softly villous and glandular, leaves orbicular palmately 7–9-fid, lobes cuneate obtusely lobulated, petals obcordate exceeding the sepals, carpels obliquely wrinkled, seeds smooth. *Boiss. Fl. Orient.* i. 882.

Temperate Western Himalaya; KISHTWAR, 6–9000 ft., *Thomson;* KUMAON, alt. 1500 ft., *Madden.*—DISTRIB. Westward to Europe and N. Africa.

A common European weed, possibly introduced into India, but also found in Affghanistan and Persia; more robust than the two preceding species, readily distinguished by the wrinkled carpels, smooth seeds, purple petals ciliate at the base, and glabrous filaments.

SECT. 4. *Peduncles* 2-flowered. *Flower-buds* pyramidal. *Sepals* broad or cordate at the base, acuminate, not abruptly awned.—Annual or biennial.

16. **G. Robertianum,** *Linn.; DC. Prodr.* i. 644; erect, much branched, pubescent or hairy, leaves triangular-oblong 5-foliolate or ternatisect segments incised or pinnatifid, peduncles slender, pedicels spreading, petals twice as long as the sepals clawed, carpels wrinkled

keeled, seeds punctulate. *Boiss. Fl. Orient.* i. 883. G. Lindleyanum, *Royle Ill.* 151, t. 27.

Western Temperate Himalaya, alt. 6–8000 ft., from KASHMIR, *Falconer*, to GARWHAL, *Strach. & Winter*.—DISTRIB. Siberia, Asia Minor, the Caucasus, Europe.

A reddish fœtid rather succulent annual or biennial. *Branches* 6–18 in., brittle, leafy. *Leaves* 1–3 in. broad; petiole long; stipules ovate. *Flowers* ½ in. diam., streaked with dark and light red. *Petals* narrow, claw glabrous. *Fruit* ⅔–1 in.; beak of carpels separating upwards from the axis and attached to its apex by silky hairs.—"Herb. Robert."

17. **G. lucidum,** *Linn.; DC. Prodr.* i. 644; annual, glabrous, shining, leaves orbicular 5–7-lobed lobes 5-fid cuneate, pedicels with a series of hairs, sepals long-awned shorter than the spathulate petals, carpels reticulate keeled nearly glabrous, seeds smooth. *Boiss. Fl. Orient.* i. 884. G. lævigatum, *Royle Ill.* 150.

Temperate Western Himalaya; from KISHTWAR to KUMAON, alt. 6–9000 ft.—DISTRIB. Siberia, Syria, the Caucasus, Europe, N. Africa.

A suberect, much-branched, brittle herb, with usually bright red branches. *Leaves* ¾–1½ in. diam., lobes short broad; stipules acute. *Peduncles* longer than the petioles. *Flowers* ⅓–½ in. diam. *Sepals* wrinkled. *Petals* rose-red, claw glabrous. *Fruit* ½ in., glabrous, beak very slender; carpels small, separating both from their beak and the axis.

18. **G. ocellatum,** *Camb. in Jacq. Voy. Bot.* 33, t. 38; annual, hoary-pubescent or hairy and glandular, excessively branched, prostrate, slender, leaves orbicular 5–7-lobed lobes cuneate 3–5-fid, petals large broadly obcordate much larger than the acuminate sepals, carpels corrugated, seeds smooth. *Walp. Ann.* i. 449. G. bicolor, *and* G. choorense, *Royle Ill.* 149, 150; *Wall. Cat.* 8562.

Hills of the PANJAB; temperate and subtropical Himalaya, alt. 1–6000 ft., from KASHMIR and the SALT RANGE to E. NIPAL; BEHAR, on the top of Parusnath, *Anderson*.

A small straggling species. *Leaves* ½–2 in. diam. *Peduncles* sometimes clustered, and subumbelled as in *G. Tuberaria*, at others axillary solitary and 1-flowered. *Flowers* ¾ in. diam., rose-coloured with a dark purple eye. *Sepals* rigid after flowering, wrinkled from pressure against the carpels. *Fruit* erect, ⅔ in. long; carpels small, separating from the axis and beak, which latter eventually coils up elastically. *Seeds* shining, pale.—Found in E. Nipal (Tambur river), but not hitherto in Sikkim.

DOUBTFUL AND UNKNOWN SPECIES.

G. HETEROTRICHON, *Sm.; Royle Ill.* 150.

G. PEDUNCULATUM, *Royle, l.c.*—Of this and the preceding species no information is given by Royle; Smith has nowhere described a *G. heterotrichon.*

4. **ERODIUM,** L'Herit.

Herbs, rarely undershrubs, with the branches swollen or jointed at the nodes. *Leaves* opposite, often alternately smaller, stipulate. *Flowers* usually regular, in axillary 1-flowered or umbelliferous peduncles. *Sepals* 5, imbricate. *Petals* 5, hypogynous, with alternating glands. *Stamens* 5, alternating with 5 staminodes. *Ovary* 5-lobed, 5-celled, long-beaked; styles 5, stigmatose longitudinally; ovules 2, superposed in each cell. *Capsule* 5-lobed 5-celled, cells 1-seeded; carpels indehiscent, separating septifragally from the axis, their beaks elastically coiling upwards from the base to the apex of the axis, hairy on the inner surface, each with usually

2 pits at the top below the beak. *Seeds* exalbuminous; embryo incumbent on the induplicate or flexuous radicle.—DISTRIB. About 50 species, natives of temperate regions in the Old World, whence a few have escaped to the New, and to the Southern Hemisphere.

* *Beak of carpels* ventrally clothed with rigid setæ that disappear towards the tip.

† *Leaves* 1–2–3-*pinnatisect.*

1. **E. cicutarium,** *Leman; DC. Prodr.* i. 646; annual, leaves pinnatisect pinnules pinnatifid not decurrent, sepals mucronate, filaments glabrous not toothed. *Boiss. Fl. Orient.* i. 890. ? E. himalayanum, *Royle Ill.* 150.

Western India, from SINDH and the PANJAB to SIMLA, ascending to 8000 ft. in LITTLE TIBET, near Iskardo.—DISTRIB. Westward to Algeria and throughout Europe and temperate N. Asia; introduced elsewhere.

Pubescent and glandular. *Branches* short or long, sometimes 2–3 ft. *Leaves* oblong, pinnules 7–11 pairs sessile; stipules ovate-lanceolate, acuminate, scarious. *Peduncles* many-flowered; pedicels hoary; bracts small, connate, ovate, hyaline. *Sepals* 5-nerved, margined. *Petals* obovate, unequal, bearded at the base, purple, often spotted. *Beak of carpels* 5 times as long as the cell, scabrous outside, almost glabrous above, pits with a concentric fold. *Seeds* very smooth; cotyledons 3-lobed.

2. **E. ciconium,** *Willd.; DC. Prodr.* i. 646; annual, leaves pinnatisect pinnules pinnatifid decurrent, sepals awned, filaments ciliate not toothed. *Boiss. Fl. Orient.* i. 891.

PANJAB, near Kohat in the Salt Range, *Stewart.*—DISTRIB. Westward to Syria, the Caucasus, and S. Europe.

Pubescent and viscid. *Branches* stout, ascending. *Leaves* ovate, pinnules toothed; stipules ovate-lanceolate, long-acuminate, scarious. *Peduncles* longer than the leaves, 2–∞-flowered; bracts scarious, mucronate, ciliate. *Sepals* ovate, membranous, with 3 glandular hairy nerves with long ciliæ and a long rough awn. *Petals* purple, obovate. *Carpels* subulate at the base, glabrous, with white hairs and a glabrous scar at the tip, pits without a fold; beak very long, scabrous outside, with brown hairs at the top and longer setæ below.

3. **E. Stephanianum,** *Willd.; DC. Prodr.* i. 645; annual, leaves 2-pinnatisect segments decurrent acutely toothed, sepals awned, filaments ciliate toothed on one side. *Ledeb. Fl. Ross.* i. 475 *in part.*

WESTERN TIBET, Ladak and Nubra, alt. 11–12,000 ft., *Thomson.*—DISTRIB. Siberia, China.

Pubescent and pilose. *Branches* diffuse. *Stipules* cuneate, acute, ciliate. *Peduncles* 2–5-flowered; bracts linear, reflexed, ciliate. *Sepals* ovate, 5-nerved, ciliate, awn long. *Petals* as long as the sepals, broadly ovate, nerved, ciliate at the base. *Carpels* hispid. *Seeds* glabrous, minutely aciculate.—The Siberian specimen in Herb. Kew. resembles the Tibetan, and does not accord with Ledebour's description as to the stamens, which, however, Chinese specimens do.

†† *Leaves not pinnatisect.*

4. **E. tibetanum,** *Edgew.;* annual?, leaves 3-fid velvety beneath, sepals obovate obtuse not awned, carpels not pitted below the beak.

WESTERN TIBET, *Falconer;* Ladak Valley below Hanle, alt. 12–15,000 ft., *Thomson, Hay.*

Hoary, almost stemless. *Leaves* oblong-ovate, more or less inciso-crenate; stipules cuneate, scarious, ciliate. *Peduncles* shorter than the leaves, 2- or more-flowered, bracts ciliate. *Sepals* pubescent, with a small knob in place of a mucro. *Petals* elliptic, exceeding the sepals. *Ovary* silky. *Carpels* brown, stipitate, with stiff white hairs, split on the back; beak ¾–1 in. long, 3–4 times the length of the cell, rough on the outer side, in the inner side with long brown hairs and a few setæ, hairy to the tip.—This resembles *E. chium* and *ægyptiacum*, which differ in their mucronate sepals.

5. **E. malacoides,** *Willd.; DC. Prodr.* i. 648; annual, leaves 3-fid or lacerate shortly pubescent, sepals awned, carpels pitted below the beak. *Boiss. Fl. Orient.* i. 893.

PANJAB, *Falconer;* Indus Valley at Attok, Peshawur, and Hazara, *Stewart.*—DISTRIB. Westward to S. Europe and N. Africa.

Softly hairy, hairs on the stem deflexed. *Stems* erect or diffuse, elongate, branched. *Leaves* ovate-oblong, acute or obtuse, shortly appressed-pubescent, lower cordate; stipules large, scarious, acute or obtuse. *Inflorescence* glandular; peduncles 3-many-flowered; bracts ovate, scarious, ciliate. *Sepals* membranous, two outer 5- and three inner 3-nerved, awn hairy. *Petals* ciliate at the base, obovate, lilac, 9-nerved. *Filaments* glabrous, lanceolate. *Staminodes* linear. *Ovary* hairy. *Carpels* stipitate, 3-gonous, setose; beak 4–5 times as long as the cell, with stiff brown hairs for ¼ of its length; pits with a deep fold.

** *Beak of carpels* plumose on the ventral face, with long soft cilia.

6. **E. stipaceum,** *Edgew.;* hoary, annual, leaves oblong crenate-toothed lobed or unequally pinnatifid, sepals silkily hoary apiculate, filaments ciliate 5 inner the broadest, carpels slender hispid with transverse wrinkles at the tip of the valves, beak very long.

WESTERN TIBET? *Vigne (Herb. Falconer);* PANJAB beyond the Indus in Bannu *Stewart.*

Root woody, but apparently annual; branches straggling. *Leaves* ½–1 in., variable in shape, oblong or linear-oblong; petiole slender. *Peduncles* several-flowered; pedicels short. *Flowers* ⅓ in. diam. *Sepals* concave, strongly 3-nerved. *Petals* narrow-cuneate, equalling the sepals. *Filaments* subulate, ciliate, the inner series much the largest and broadest. *Fruit* 3–4 in., slender, erect; carpels slender, narrowed into a stipes, terete, transversely grooved at the base of the beak, covered with stiff hairs with swollen bases, beaks membranous, silky, hairs fulvous.—A very close ally of *Monsonia heterotricha*, notwithstanding the different stamens.

DOUBTFUL AND EXCLUDED SPECIES.

E. VIOLÆFOLIUM, *Turz. Mosc. Bull.* xxxvi. i. 592. "Cæspitose, diffuse, pilose, leaves petiolate cordate obtuse sinuate-lobate crenate, with scattered adpressed hairs, peduncles 3–5-flowered, calyx aristate, fruit densely hairy."—Western Peninsula, *Perrotet.* "Root fibrous, stalk 4–5 in. long, arista not plumose when young."—Specimens not seen, only known from the above (? *Monsonia senegalensis*).

E. NILAGIRICUM, *Schlecht. Herb. Ind. Or.* 1560, is an introduced Cape *Pelargonium* (*P. grossularioides*).

5. **OXALIS,** Linn.

Acid herbs, rarely shrubby. *Leaves* radical or alternate, stipulate or exstipulate, compound, usually 3-foliolate. *Flowers* on axillary 1- or more-flowered peduncles, regular. *Sepals* 5, imbricate. *Petals* 5, hypogynous, contorted. *Glands* of the disk 0. *Stamens* 10, free or united at the base, all anther-bearing. *Ovary* 5-lobed, 5-celled; styles 5, distinct, stigma terminal capitate 2-fid or laciniate; ovules 1 or more in each cell. *Capsule* with loculicidal dehiscence, valves persistent to the axis. *Seeds* with an outer fleshy coat which bursts elastically, testa crustaceous, albumen fleshy; embryo straight.—DISTRIB. Species about 200, chiefly tropical and temperate S. American and S. African.

1. **O. corniculata,** *Linn.; DC. Prodr.* i. 692; appressed-pubescent, diffuse, creeping, leaves 3-foliolate, stipules adnate to the petiole, peduncles 2-∞-fid, petals yellow notched. *Boiss. Fl. Orient.* i. 866; *Wall. Cat.* 4347; *Roxb. Fl. Ind.* ii. 457; *W. & A. Prodr.* 142. O. repens, *Thunb.; Wight Ic.* t. 18. O. pusilla, *Salisb.; Roxb. l.c.*

Throughout the warmer parts of INDIA and CEYLON, ascending the Himalaya to 7000 ft.—DISTRIB Cosmopolitan.

A very variable weed, abundant in cultivated places. *Leaves* long-petioled; leaflets obcordate. *Flowers* subumbellate. *Sepals* obtuse, bracts setaceous. *Petals* yellow, obcordate. *Fruiting-pedicels* depressed. *Capsule* tomentose, subcylindric, cells many-seeded. *Seeds* transversely ribbed.

2. **O. Acetosella,** *Linn.; DC. Prod.* i. 700; pilose, stemless, rootstock creeping scaly, leaves all radical 3-foliolate leaflets broadly obcordate, stipules large broad membranous, peduncles 1-flowered, petals white. *Boiss. Fl. Orient.* i. 806.

Temperate Himalaya, from KASHMIR, alt. 8000 ft., to SIKKIM, alt. 8–12,000 ft.—DISTRIB. N. Asia, Europe, N. Africa, N. America.

Petioles 3–6 in.; leaflets ⅓–⅝ in., obcordate, often purple beneath. *Peduncle* axillary, slender, 2-bracteolate about the middle. *Flowers* ½–¾ in. diam. *Sepals* oblong. *Petals* obovate, white or pale-rose, veined with purple, erose, cohering above the claw. *Capsule* erect, cells 2–3-seeded. *Seeds* longitudinally ribbed.

3. **O. Griffithii,** *Edgew. & Hook. f.;* pilose or villous, rootstock creeping, leaves all radical 3-foliolate leaflets triangular retuse, stipules small ovate-lanceolate, peduncles 1-flowered, petals white.

Temperate Eastern Himalaya; BHOTAN, *Griffith;* SIKKIM, in woods, alt. 8–10,000 ft. *J. D. H.;* KHASIA MTS., alt. 5–7000 ft., *H. f. & T.*

Very similar to *O. Acetosella*, but the whole plant more hairy, leaflets triangular, and stipules small.

6. **BIOPHYTUM,** De Cand.

Annual rarely perennial herbs, with simple or branched stems. *Leaves* abruptly pinnate, fascicled or almost whorled at the top of the stem; leaflets opposite, oblique; petiole swollen at the base. *Peduncles* terminal; pedicels umbelled. *Flowers* small, yellow, rarely purple. *Sepals* 5, lanceolate, acuminate. *Petals* 5. *Stamens* 10, filaments free, 5 outer smaller. *Styles* 5, stigmas notched at the apex or 2-fid. *Capsule* ovoid or oblong or subglobose, splitting loculicidally sometimes to the base into 5 spreading valves. *Seeds* as in *Oxalis.*—DISTRIB. Tropical Asia, Africa, and America. Species about 20; various species have sensitive leaves which, and the leaflets, close downwards. The flowers are dimorphous as regards the relative length of the styles and stamens.

* *Stem simple. Leaflets rounded or merely apiculate at the tip, the terminal pair usually the largest.*

1. **B. sensitivum,** *DC. Prodr.* i. 690; leaflets 6–15 pairs oblong nearly straight except the terminal tip apiculate or not, peduncles long or short not clubbed at the top; flowers shortly pedicelled, sepals usually much exceeding the capsule, seeds with obliquely transverse tubercled ridges. *Roxb. Fl. Ind.* ii. 457; *W. & A. Prodr.* 162; *Bot. Reg.* xxxi. t. 68; *Wall. Cat.* 4343 C, E.

Throughout the hotter parts of INDIA, ascending to 6000 ft. in the Himalaya, and CEYLON.—DISTRIB. Tropical Asia, Africa, and America.

Stems long or short, slender or robust, hispidly pubescent. *Leaves* 1½–5 in.; petiole hispidulous or merely ciliate; leaflets very variable in size, ¼–½ in., sometimes arched a little upwards, nearly equal at the base except the terminal one, which is obovate and oblique at the contracted base, nerves few or many rather oblique often waved. *Peduncles* very variable, ½–5 in., hispid, sometimes swollen at the tip; bracts rigid, setaceous; pedicels usually shorter than the sepals, sometimes equalling them or a little longer. *Sepals* rigid, subulate-lanceolate, grooved, glandular and hispid. *Petals* usually twice as long as the sepals, yellow (sometimes purple?). *Capsule* elliptic, shining; cells few-seeded. *Seeds* very variable, minute, with transverse oblique acute or obtuse ridges that are more or less broken up into tubercles.

VAR. 1. *Candolleana;* leaflets 10–15 pairs, more or less strigose or appressed pilose on the upper surface, seeds both tubercled and grooved. B. Candolleanum, *Wight Ill.* i. 161, t. 62; *Wall. Cat.* 4343 D.—Western Peninsula, and Ceylon.

VAR. 2. *assamica;* leaves 3–7 in., leaflets 7–15 pairs glabrous, petiole and rachis nearly glabrous, seeds turbinate smooth acutely furrowed, flowers yellow. *Wall. Cat.* 4343 G.—Assam.

VAR. 3. *nervifolia;* leaflets about 12 pairs glabrous, nerves few strong and waved beneath as in *B. Apodiscias.* B. nervifolium, *Thwaites Enum.* 64.—Bengal, Ceylon. Mr. Edgeworth, who has laboriously studied the Indian forms of this genus, distinguishes as species—1, *B. Candolleanum*, described above; 2, *B. sesbanioides*, Edgew. mss (Wall. Cat. 4343 A), with ciliate downy nerved leaflets, and (judging from dried specimens) purple flowers; 3, *B. Cumingianum*, Turcz. in Bull. Mosc., with 6–15 pairs of glabrous leaflets, and 4, *B. poterioides*, Edgew. mss. (Wall. Cat. 4343 B) which is stemless with 6–12 pairs of glabrous leaflets, strongly nerved beneath, purple petals and shining not tubercled seeds with forked furrows.

2. **B. Apodiscias,** *Turcz. in Bull. Mosc.* xxxvi. i. 599 (Aposcias *by error*); leaflets 5–7 pairs small shortly and reniformly obovoid widening towards the rounded tip, nerves beneath few strong horizontal waved, pedicels sessile, seeds with scattered tubercles. Oxalis sessilis, *Hamilton in Wall. Cat.* 4344. O. Petersii, *Klotzsch in Peters Mossamb. Reis. Bot.* t. 5.

BENGAL, at Monghir, *Hamilton;* ASSAM, *Griffith;* KHASIA MTS., alt. 3–5000 ft., *J. D. H. & T. T.;* MYSORE and CARNATIC, *G. Thoms. Herb.*

Annual. *Stem* 1–2 in., slender. *Leaves* 1–1½ in., crowded; leaflets rather coriaceous, pale, the lowest smallest orbicular-ovate, the middle ones truncate at the base, the terminal with a contracted oblique base and much arched midrib; petiole puberulous. *Flowers* ⅛ in. long. *Sepals* exceeding the pedicels.—Probably only a state of *B. sensitivum*, approaching var. *nervifolium*, but distinguished by the small size, arched midrib of the leaflets, absence of peduncle, and simply tubercled seeds.

3. **B. adiantoides,** *Wight mss.*; leaflets 12–25 pairs linear-oblong tip rounded very unequal at the base, midrib straight, peduncles slender, pedicels equalling the sepals.

TENASSERIM, at Mergui, *Griffith.*

A very distinct and large species; stem, petiole, rachis and peduncles tomentose and pilose. *Leaflets* ⅜ in. long, sides nearly straight, base obliquely truncate, lower edge short, upper long, sometimes produced into an obscure lobe at the anterior margin. *Peduncles* slender, with a clubbed mass of bracts at the apex. *Flowers* imperfect.

4. **B. Reinwardtii,** *Walp. Rep.* i. 476; leaflets 10–20 pairs oblong tip rounded equal at the base glabrous, midrib straight, nerves slender oblique, peduncles slender, pedicels equalling or exceeding the small flowers, capsule almost equalling the small sepals. O. sensitiva, *Zucc. in Munch. Denks.* ix. 183, t. v. B. O. Reinwardtii, *Zucc. in Munch. Abhand.* i. 274.

O. Metziana, *Miq. in Herb. Hohenack.* 144. O. gracilenta, *Kurz in Journ. As. Soc. Beng.* 1870, ii. 68. O. sensitiva, *Wall. Cat.* 4343 F, H.—*Rheede Hort. Mal.* ix. 33, t. 19.

Throughout the hotter parts of India, as far to the N.W. as GARWHAL; and in CEYLON.—DISTRIB. China, Java.

But distinguished from *B. sensitivum* by the graceful habit, slender peduncles, and small flowers with the capsule not much overtopped by the sepals. The seeds vary in amount of furrowing and tubercles exactly as in *B. sensitivum.* The following three varieties are regarded as species by Mr. Edgeworth:—

VAR. 1. *Reinwardtii proper;* seeds spirally furrowed. O. Reinwardtii, *Zucc. in part.* O. sensitiva, *Linn. Herb. in part; Wall. Cat.* 4343 B 2.

VAR. 2. *nervioides;* seeds deeply furrowed and tubercled.

VAR. 3. *Metziana;* seeds turbinate 5–7 furrowed tuberculate.—To which should be added—

VAR. 4. *gracilenta;* seeds tubercled not furrowed.

** *Stem usually branched in a proliferous manner. Leaflets usually cuspidate or acuminate; the terminal pair generally shorter than the rest.*

5. **B. nudum,** *Arn. in Nov. Act. Acad. Cæs.* xviii. 326; stem tall simple or branched, leaflets 15–30 pairs linear-oblong obliquely abruptly cuspidate equal at the base, midrib straight, nerves close-set, pedicels equalling or exceeding the sepals, seeds tubercled not furrowed. *Wight Ill.* i. 161.

CEYLON, Central Province, alt. 4–6000 ft.

Apparently annual. *Stem* 6–18 in., sometimes as stout as a goose-quill, often umbellately branched. *Leaves* 2–3 in., rachis tomentose; leaflets $\frac{1}{3}$ in., glabrous, margins thickened, base truncate. *Peduncles* slender, pubescent; pedicels pilose. *Sepals* $\frac{1}{6}$ in., scarcely exceeding the globose capsule.

6. **B. proliferum,** *Arn. in Nov. Act. Acad. Cæs.* xviii. 327; stem slender prostrate copiously dichotomously branched from a woody stock, leaves short, leaflets very small 5–10-pairs oblong obliquely cuspidate, midrib nearly straight, base equal, peduncles very short usually 1-flowered, seeds tubercled not furrowed. *Wight Ill.* i. 162.

CEYLON, alt. 6000 ft., *Walker, Gardner,* &c.

A remarkable species, easily recognised by its excessively branched prostrate habit, slender branches, minute leaflets, and solitary, rarely geminate flowers. *Branches* and peduncles pubescent. *Leaves* rarely 1 in., in whorls; leaflets $\frac{1}{8}$ in. long, usually glabrous above; nerves oblique, slender. *Peduncles* much shorter than the leaves and than the very slender pedicels. *Sepals* hairy, about as long as the leaflets.—I identify this with Arnott's plant on the faith of two specimens thus ticketed by himself in Wight's Herbarium, though Arnott describes the umbel as 2–5-flowered, and the leaflets as pilose above, and does not allude to the remarkable smallness of the foliage; whence I suspect that he had both this and the following under his eye.

7. **B. intermedium,** *Wight Ill.* i. 162; branches very numerous from a stout woody rootstock slender dichotomously branched, leaflets 15–20 pairs linear-oblong abruptly cuspidate, midrib somewhat arched, base equal, peduncles usually exceeding the leaves several-flowered.

CEYLON, *Walker.*

A much larger plant than *B. proliferum,* of a very different habit, having long arching branches arising from a woody stock as thick as the finger. *Leaves* 2 in. long; leaflets $\frac{1}{4}$–$\frac{1}{3}$ in., glabrous or pilose above, margins sometimes ciliate, nerves close-set, oblique; petiole ciliate with long hairs. *Flowers* three times as large as in *B. proliferum.*—I have identified this by specimens in Wight's Herbarium; which contains a somewhat similar plant (described below as a variety) from the Pulney Mountains that differs in being apparently annual, and having more pilose foliage.

? Var. 1. *pulneyense;* annual, stem simple below subumbellately branched above, leaflets slightly hairy above. O. sensitivum, *Herb. Wight Kew Distrib.* 302.—Pulney Mts.

Var. 2. *verticillatum;* annual?, stem dichotomously branched, leaves and leaflets smaller often much ciliated on one or both surfaces. B. verticillatum, *Wight Ill.* i. 162. —B. sensitivum *var.* Heyneana, *Wall. Cat.* 4343 I.

8. **B. polyphyllum,** *Munro in Wight Ill.* i. 162; silky and villous, stem stout umbellately branched, leaves long very narrow flexuous, leaflets minute 30–50 pairs shortly falcate-oblong gradually and obliquely acuminate terminal pair much the smallest.

NILGHIRI MTS., at Kundalis, *Munro.*

An exceedingly curious and distinct species, remarkable for the slender, flexuous leaves, 2–3 in. long, and very minute crowded leaflets, $\frac{1}{8}$ in. long, which are not abruptly cuspidate as in the preceding species; rachis villous with long hairs.

6.* AVERRHOA, Linn.

Trees. *Leaves* alternate, exstipulate, pinnate with a terminal leaflet; leaflets subopposite. *Flowers* small, regular, in panicled axillary or ramal cymes. *Sepals* 5, imbricate. *Petals* 5, contorted. *Glands* 0. *Stamens* 10, united at the base, all perfect or 5 without anthers. *Ovary* 5-lobed, 5-celled, without a beak; styles 5, distinct, stigmas capitate; ovules numerous in the cells. *Berry* oblong, 5-lobed. *Seeds* naked or arilled, albumen scanty, fleshy; embryo straight.—DISTRIB. Three or four species, of which two are copiously cultivated in many hot countries, probably both natives of the New World, in which alone is a native species found. Very likely both were introduced by the Portuguese into India.

A. CARAMBOLA, *Linn.; DC. Prodr.* i. 689; leaflets 2–5 pairs ovate or ovate-lanceolate acute glabrous and glaucous beneath, fruit with acutely angled lobes, seeds arillate. *Roxb. Fl. Ind.* ii. 450; *W. & A. Prodr.* 141; *Brandis For. Flor.* 45; *Beddome Fl. Sylvat.* 39.—*Rheede Hort. Mal.* iii. t. 43, 44.

In gardens throughout the hotter parts of INDIA as far north as Lahore.—Native country unknown.

A small tree, densely branched. *Leaflets* 1½–3 in.; petiole stout, pubescent. *Flowers* chiefly axillary, variegated white and purple. *Calyx* glabrous, half as long as the petals. *Stamens* 10, 5 shorter without anthers, or sometimes 1 or 2 of these longer and antheriferous. *Ovary* pubescent. *Fruit* 3 in. long, yellow; aril 2-lobed, lacerate.—Two varieties are known, sweet and sour. The former is eaten raw and cooked. Leaflets irritable to the touch.

A. BILIMBI, *Linn.; DC. Prodr.* i. 689; leaflets 5–17 pairs oblong or linear-lanceolate acuminate pubescent beneath, fruit with 5 rounded lobes, seeds not arillate. *Roxb. Fl. Ind.* ii. 451; *W. & A. Prodr.* 142; *Brandis For. Fl.* 46; *Beddome Fl. Sylv.* t. 117.—*Rheede Hort. Mal.* 3, t. 45.

In gardens throughout the hotter parts of INDIA, also naturalized as an escape.—Native country unknown.

7. CONNAROPSIS, Planch.

Trees or shrubs. *Leaves* pinnately 1–3-foliolate; leaflets coriaceous, quite entire, strongly nerved, triple-nerved at the base, margined. *Flowers* minute.

regular, in terminal and axillary panicled cymes. *Sepals* 5, imbricate, connate at the base. *Petals* 5, imbricate. *Glands* 0. *Stamens* 10, filaments united at the base, the alternate shorter. *Ovary* 5-angled, 5-celled; styles 5, subulate, stigmas apiculate; ovules 2 in each cell. *Fruit* fleshy, 5-lobed.—DISTRIB. Three species, all from the Malayan archipelago.

1. **C. monophylla,** *Planch. in Herb. Hook.;* leaves 1-foliolate, leaflets ovate obtusely acuminate shining above glaucous beneath, panicles puberulous of slender spiciform erect branches.

MALACCA, *Griffith, Cuming, Maingay.*

A small round-headed tree. *Leaflets* 2–3 in., quite entire; petiole ⅓ in., slender. *Panicles* 3–5 in. long. *Sepals* pubescent. *Corolla* suburceolate; petals oblong, blood-red, tips subrecurved. *Ovary* pilose. *Fruit* obtusely angled, 5-furrowed; endocarp fibrous, sending outwards fibres which reticulately divide the sarcocarp. *Albumen* copious; embryo green, radicle terete. (*Descr.* chiefly from Griffith's notes.)

2. **C. Griffithii,** *Planch. in Herb. Hook.;* leaves 3-foliolate ovate or elliptic-lanceolate long-acuminate opaque above, panicles short broad tomentose. *Hook. f. in Trans. Linn. Soc.* xxiii. 166 (*name only*).

MALACCA, *Griffith, Maingay.*

A small tree. *Branches* woody, bark black. *Leaflets* 2½–3½ in., pale, pubescent, as are their short petioles; nerves remote; petiole ¾ in., that of the leaflets ¼ in. *Inflorescence* ferruginous. *Flowers* usually all antheriferous. *Stamens* usually on the old wood, ½ in. long, brown purple. *Fruit* 2 in., yellow.—Kurz (*Journ. As. Soc. Bengal,* 1870, ii. 69), considers that this should bear the name of *C. diversifolia*, because it was first described as *Rourea diversifolia* by Miquel (*Fl. Ind. Bat. Suppl.* 528), a view I cannot adopt, seeing that Miquel put it not only in a wrong genus, but in a wrong Natural Order, and that the trivial name *diversifolia* is not applicable. Moreover, I doubt *C. Griffithii* being the same with Miquel's plant, which latter has lucid leaves, whereas those of *C. Griffithii* are singularly opaque.—*Fruit* acid, eaten cooked, pickled or preserved with sugar. Leaves irritable to the touch.

8. **IMPATIENS,** *Linn.* (By J. D. Hooker.)

Herbs, rarely shrubby at the base. *Leaves* opposite or alternate, in some whorled, in others all radical, simple, exstipulate, or with stipular glands at the base of the petiole. *Flowers* in scapes, or in axillary or terminal 1–2–many-flowered peduncles, irregular, resupinate. *Sepals* 3 rarely 5, imbricate; 2 anterior when present minute; 2 lateral small, flat, usually green; posterior (anterior in flower) large, petaloid, produced into a hollow spur or sac. *Petals* 3 (or 5); anterior (outer in bud) large; lateral 2-lobed (or 2 connate). *Stamens* 5, filaments short, broad; anthers cohering. *Disk* 0. *Ovary* oblong, 5-celled; stigma sessile, 5-toothed; ovules many, 1-seriate in each cell. *Capsule* loculicidal; valves 5, elastically springing away from a placentiferous axis. *Seeds* smooth or tubercled, glabrous or hairy, albumen 0; embryo straight.—DISTRIB. Mountains of trop. Asia and Africa, rare in temp. Europe, N. America, N. Asia, and S. Africa; species about 150.

The species of *Impatiens* are difficult of determination, in a dried state especially; and for Beddome's I am chiefly dependent on his published plates. Minute flowers fertilized in the bud occur in some species apart from the others. The following arrangement is that suggested by myself in the Journal of the Linnean Society, vol. iv. p. 106 (Dec. 1859), with the addition of the Peninsula species subsequently described by Beddome, and with the important change consequent on dividing the genus into two principal groups, a Himalayan, with slender terete or obovate capsules, and a chiefly Peninsular group, with the capsule short and swollen in the middle. To avoid verbiage I shall employ the same terms used in that arrangement, of *Sepals* for the 2 lateral sepals (or 4 when present); *Lip* for the spurred sepal; *Standard* for the petal next the axis; and *Wings* for the combined pairs of lateral petals.

Conspectus of Sections.

Series A. *Capsule* ellipsoid or oblong, short, (rarely ½ in.), turgid in the middle. *Seeds* rounded, often with a shining brittle or hairy testa. —Chiefly Peninsular, Ceylon and Khasian species.—Capsule slender in *I. Kleinii, trilobata,* and perhaps in a few other species of group III.

A I.—Scapigeræ. *Root-stock* tuberous, perennial. *Leaves* all radical. *Scape* slender; flowers racemed.—All *Western Peninsula* and *Ceylon.* (Sp. 1–9.)

A II.—Oppositifoliæ. Annual. *Leaves* all opposite, or the upper rarely all whorled in threes (never alternate), usually acutely serrate. *Pedicels* solitary or fascicled. *Seeds* few, large, testa black glabrous.—The pedicels of *I. Lawii, salicifolia,* and others are sometimes arranged on a short peduncle. (Sp. 10–25.)

A III.—Subverticillatæ. Annual. *Leaves* all opposite or subopposite, or the lower alternate and upper opposite or whorled, rarely all alternate. *Peduncles* 1- or more-flowered. *Seeds* often villous or hairy. (Sp. 26–36.)

A IV.—Unifloræ. Mostly annual. *Leaves* all alternate, usually rather distant. *Flowers* solitary or fascicled; pedicels not crowded on a common peduncle. (Sp. 37–53.)

A V.—Lateriforæ. *Leaves* all alternate, rather distant, not all approximate or whorled. *Peduncles* axillary, 1–3 rarely 4–5-flowered; flowers racemose (not umbelled). (Sp. 54–57.)

A VI.—Epiphyticæ. Succulent short stemmed epiphytes. *Peduncles* 1-2-flowered. *Standard* and wings very small; lip very large, laterally compressed and saccate.—*Western Peninsula.* (Sp. 58–60.)

A VII.—Umbellatæ and Subcapitatæ. *Leaves* all alternate, rarely opposite, often crowded at the end of the stem or branches and almost whorled.—*Flowers* in peduncled dense racemes or subumbelled corymbs; bracts often conspicuous.—Chiefly *Western Peninsula* and *Khasia Mts.* (Sp. 61–76.)

A VIII.—Racemosæ. *Leaves* usually crowded upwards, all alternate. *Peduncles* many, subterminal, elongate, at length exceeding the leaves, many-flowered. *Flowers* racemose, rarely whorled or fascicled. (Sp. 77–87.)

Series B. *Capsule* elongate, linear or clavate, rarely shortly clavate *Seeds* oblong or obovoid, compressed; testa usually rugulose, opaque, coriaceous, quite glabrous.—Chiefly Himalayan and Khasia Mts. species. (Capsule doubtful in *I. tropæolifolia,* Griff.)

B I.—Oppositifoliæ and Verticillatæ. *Leaves* all opposite or whorled or a few alternate.—Stout, tall, succulent, annual species, with subumbelled, often purplish flowers on long peduncles. (Sp. 88–91.)

B II.—Unifloræ. *Leaves* all alternate. *Flowers* solitary or rarely 2 together, on slender axillary pedicels. (Sp. 92–94.)

B III.—Axillifloræ. *Leaves* all alternate. *Flowers* in axillary 2–4-flowered peduncles, not umbelled or racemed. (Sp. 95–106.)

B IV.—SUBUMBELLATÆ. *Leaves* all alternate, very rarely opposite. *Peduncles* usually fascicled towards the top of the stem or branches, many-flowered. *Flowers* in interrupted racemes, subumbelled or whorled, often large purplish, small and yellow in *I. radiata.* (Sp. 107–111.)

B V.—RACEMOSÆ. *Leaves* alternate, very rarely opposite. *Peduncles* usually fascicled towards the top of the stem or branches. *Flowers* often small, in uninterrupted racemes, usually yellow. (Sp. 112–122.)

A. Capsule short, trapezoid or ellipsoid.

A I.—SCAPIGERÆ.

* *Spur shorter than the flower or* 0. *Wings* 3-*lobed, except in* I. orchioides.

1. **I. Beddomei,** *Hook. f.;* quite glabrous, leaves orbicular or reniform-cordate, bracts obtuse or subacute, standard short broader than long, wing-lobes 3 subequal retuse, spur incurved clavate obtuse. I. scapiflora, *W. & A. Prodr.* 137 *in part; Wight Ill.* t. 967; *H.f. & T. in Journ. Linn. Soc.* iv. 118; *Dalz. & Gibs. Bomb. Flor.* 43, *not of Heyne.*

Mountains of MALABAR; near Dodabet, Coonnoor, and elsewhere in the Nilghiris, *Wight.*

A foot high or less. *Leaves* 1–4 in. diam., fleshy, quite entire or obscurely crenate-serrate; nerves flabellate. *Racemes* 1–4 in.; bracts broadly ovate; pedicels slender. *Flowers* ½ in. diam.; sepals broadly and obliquely ovate; wings with three subequal short truncate retuse lobes; spur rather shorter than the flower. *Capsule* ⅓ in., elliptic. *Seeds* minute, granulate.—Being obliged to find a new name for this beautiful plant, I have selected that of Col. Beddome, who has made the Peninsular species his special study.

2. **I. modesta,** *Wight in Madr. Journ.* v. 13; *Ic.* t. 968; leaves ovate-cordate acute crenate-serrate sparsely hairy above, bracts with thickened tips, standard short broader than long, wings with 3 subequal obtuse lobes, spur recurved short obtuse. I. tenuis, *Bedd. in Madr. Journ.* ser. 2, iv. 69, t. 7, f. 12; *Ic. Pl. Ind. Or.* p. 31.

Mountains of MALABAR; Nilghiri, and Sivagherry hills, *Wight.* Anamallay hills, alt. 5–7000 ft., *Beddome.*

A foot high or less. *Leaves* 1–5 in.; basal lobes rounded, with a rounded sinus on each side of the petiole. *Scape* very slender; raceme 1–2 in.; pedicels capillary; bracts much smaller and narrower than in *Beddomei. Flowers* ⅓ in. diam., pink; sepals small. *Capsule* ⅙–¼ in., elliptic, acute at both ends. *Seeds* minute. (*Wings* pubescent on the surface, *Beddome.*)

3. **I. Stocksii,** *H. f. & T. in Journ. Linn. Soc.* iv. 119; very small, quite glabrous, leaves orbicular oblong or broad-ovate obtuse crenate base acute or rounded, bracts acute, standard orbicular, lip boat-shaped spur less. *Dalz. & Gibs. Bomb. Flor.* 42.

Mountains of the CONCAN, *Law, Stocks.*

Much the smallest of the Scapigerous section, 1–4 in. *Leaves* ½–¾ in. diam., tip obtuse or rounded, nerves flabellate; petiole as long or shorter than the blade; pedicels thick for the size of the plant; bracts small, ovate. *Flowers* few, 3–6. *Sepals* broadly ovate, obtuse; standard as broad as long, not very concave, obtuse, rather rhomboid; wings with three obtuse lobes, the lower rather the longest. *Capsule* ¼ in., elliptic, turgid, acute. *Seeds* minute, linear-oblong.

4. **I. crenata,** *Bedd. in Madr. Journ.* ser. 2, iv. 69, t. 7, f. 10; *Ic. Pl. Ind. Or.* p. 31; leaves orbicular-reniform or cordate crenate, scape very

slender few-flowered, standard broader than long very concave, spur short obtuse. I. Akka, *Beddome, l.c.* 69, f. 11.

MALABAR, in the Anamallay and Akka Mts, alt. 5–8000 ft., *Beddome.*

I have not seen this species, which Beddome describes as perhaps not distinct from *I. Stocksii;* from which, however, it seems to differ in the large flowers, long scapes, short pedicels, shape of the standard, and presence of a distinct spur, as well as in the habitat. Though originally described as different plants, Beddome subsequently united his *I. crenata* and *Akka,* which according to his descriptions differ in the first having hairy nerves on the leaves above, short petioles, and a crenate standard; both have hairy upper surfaces of the wings and large flowers (how large is not stated), pure white with a blue tuft of hairs in *I. crenata.*

5. **I. orchioides,** *Bedd. Ic. Pl. Ind. Or.* p. 31, t. 151; leaves ovate-cordate obtuse acuminate very hairy above, bracts ovate, standard ovate, wings with two subulate tails, lip saccate spurless.

Koondah Mts. in MALABAR, near Avalanche Ghat, *Beddome.*

Leaves 1½–2 in., glabrous beneath, crenatures bristle-pointed; petiole very long. *Scape* 6–7-flowered; pedicels very slender. *Flowers* ⅓ in. diam., like those of a *Liparis,* reddish-brown; sepals ovate; standard obtuse, not vaulted; wings with a dimidiate-oblong blade produced into two pendulous tails longer than itself; lip acute. *Capsule* contracted at both ends. *Seeds* minute scrobiculate.—Description from Beddome, who describes the sepals as small, but figures them as remarkably large for the size of the plant.

** *Spur longer than the flower. Wings 3-lobed (except in* I. acaulis).

6. **I. acaulis,** *Arn. in Hook. Comp. Bot. Mag.* i. 325; glabrous, leaves orbicular ovate-cordate or oblong, base acute rounded or cordate (not deeply 2-lobed), standard obovate very concave, wings 2-partite terminal lobe largest, spur very slender. *Thwaites Enum.* 68; *Dalz. & Gibs. Bomb. Flor.* 42; *H. f. & T. in Journ. Linn. Soc.* iv. 118; *Bedd. Ic. Pl. Ind. Or.* p. 31. I. scapiflora, *Hook. Bot. Mag.* t. 3587; *W. & A. Prodr.* 137, *in part.* I. bulbosa, *Moon Cat.* 18. I. gracilis, *Bedd. in Madr. Journ.* ser. 2, iv. 69, t. 7, f. 13.

Mountains of the central province of CEYLON; alt. 3–5000 ft., and of MALABAR and the CONCAN?

Very variable in size and robustness, 2–12 in. high. *Leaves* 1–6 in.; usually on slender petioles, more or less crenate. *Scape* stout. *Racemes* 1–4 in.; bracts broad; pedicels stout, 1 in. *Flowers* ½–1½ in. broad; sepals broadly ovate; standard short, broader upwards; wings variable in the length and breadth of the segments, which are falcate and truncate; spur very slender, variable in length. *Capsule* ¼–⅓ in., ellipsoid, acute at both ends.—Thwaites suspects that the Ceylon plant cannot be *scapiflora,* because Wallich describes the spur as several inches long, but in some of our specimens it attains 3 inches. Wight and Arnott, in the Prodromus, apparently confound *acaulis* with the true *I. scapiflora.* There is so much diversity in the foliage of specimens which the 2-partite wing obliges me to refer to this species, that I cannot but repeat that this and the three following may prove to be forms of one. Some have the orbicular reniform leaves of *I. scapiflora,* others the ovate-cordate and pilose leaves of *I. rivalis* (notably Thwaites, No. 2595), others the elliptic leaves of *I. rivalis,* var. 2, and still others the oblong leaves with rounded sinus of *I. Denisonii.* The species of this group cannot be determined from dried specimens. Beddome (*Ic. Pl. Ind. Or.* p. 31) states that *I. acaulis* and *rivalis* "could never be confounded except in dried specimens."

7. **I. scapiflora,** *Heyne in Roxb. Fl. Ind. ed. Carey,* ii. 464; leaves orbicular cordate or reniform sinus usually deep and broad above tip rounded obscurely crenate serrate, standard large orbicular rhomboid, wings with 3 broad segments, spur very slender.

Mountains of MALABAR, *Heyne;* Bababud, *Herb. Rottler.*

A specimen of this plant in Rottler's Herbarium, labelled by himself "*I. scapiflora*, Heyne," may, I assume, be regarded as authentic for the plant discovered by the author of the species. It is certainly not the plant which bears this name in the Linnean Journal (see *I. Beddomei*), which has a short spur and 2-partite wings; it entirely resembles round-leaved forms of *I. acaulis*, except in the 2-partite wings. The *leaves* are evidently fleshy, obscurely crenate, with radiating nerves; the *bracts* thick, and scape and pedicels stout. *Flowers* 1 in. diam.; segments of wings recurved-falcate linear, rather broad, tips rounded.

8. **I. rivalis,** *Wight in Madr. Journ.* v. 13, t. 8; *Ic.* t. 751; leaves ovate-cordate with an acute sinus or a rounded base or elliptic and acute at both ends crenate-serrate usually hairy above, standard broader than long vaulted, wings 3-partite, spur very long. *H. f. & T. in Journ. Linn. Soc.* iv. 119.

Mountains of the CONCAN, CANARA, MALABAR, and TRAVANCOR, alt. 5–8000 ft.

Very variable in stature, 6–18 in. high. *Leaves* extremely variable in form and pubescence, feather-nerved, never orbicular-reniform with a broad sinus as in *I. scapiflora* and *Denisonii.*—Except by the wings I do not see how some specimens are to be distinguished from *I. acaulis*, but Beddome says they "never could be confounded except in dried examples;" he reduces his *verrucosa* to this species (Ic. Pl. Ind. Or. p. 31).

VAR. 1. leaves 2–5 in. ovate-oblong hairy acute, base rounded or cordate. *Wight Ic.* t. 757.

VAR. 2. leaves 4–8 in. elliptic acute at both ends, petiole as long very stout.—Concan, *Stocks.*

VAR. 3. leaves 3–4 in. ovate-cordate, wings with a batch of warts on the upper surface. I. verrucosa, *Bedd. in Madr. Journ.* iv. 69, t. 7, f. 9.

9. **I. Denisonii,** *Bedd. Ic. Pl. Ind. Or.* p. 30, t. 151; leaves ovate-cordate obtuse or acute crenate pilose above base deeply 2-lobed sinus broad, scape and pedicels very long and slender, standard broadly ovate vaulted, wings 3-partite bearded on the inner face, lateral segment with a filiform appendage enclosed in the long recurved spur.

NILGHIRI MTS.; abundant in the Sisparah ghat, alt. 4–5000 ft., *Beddome.*

Apparently very near to *I. rivalis*, differing in the deeply 2-lobed base of the leaf, smaller flowers, ($\frac{3}{4}$ in. diam.) with much narrower and longer segments to the wings, and in the curious filiform appendages of the latter that descend into the spur as in *I. racemosa*, and which are no doubt concerned in the process of fertilization. I suspect that Herb. Wight. Kew Distrib. 310 is referable to this, not to *I. acaulis.*

A II.—OPPOSITIFOLIÆ.

* *Spur as long as the flower or longer.*

10. **I. chinensis,** *Linn.;* glabrous, stem angled, leaves all opposite subsessile linear-oblong or obovate, stipules setaceous, sepals linear, standard orbicular, wings semi-obovate entire base auricled, spur very slender incurved. *Dalz. & Gibs. Bomb. Fl.* 42; *H. f. & T. in Journ. Linn. Soc.* iv. 119. I. fasciculata, *Lamk. Dict.* i. 359; *Wight Ic.* t. 748; *W. & A. Prodr.* 138; *Hook. Bot. Mag.* t. 4631. I. heterophylla, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 458; *Cat.* 4748. I. setacea, *Coleb. in Hook. Exot. Flor.* t. 137. Balsamina fasciculata *and* B. chinensis, *DC. Prodr.* i. 686.—*Rheede Hort. Mal.* ix. t. 47.

BHOTAN, *Griffith;* mountains of the WESTERN PENINSULA, from the Concan to Travancor, alt. 5–8000 ft; KHASIA MTS., alt. 3–5000 ft.; BIRMA, *Wallich*; TENASSERIM, *Helfer;* MALACCA, *Griffith.*—DISTRIB. China.

A very variable and beautiful plant. *Stem* 4–16 in., erect from a rooting prostrate base. *Leaves* ½ to nearly 4 in., serrate, linear-oblong obovate or almost rounded, sharply serrate, acute or obtuse, base acute rounded or subcordate, glabrous or sparsely hairy, rather thick, glaucous beneath, basal serratures often setaceous; stipules subulate, gland-tipped, recurved. *Pedicels* shorter or longer than the leaves, solitary or fascicled, fruiting deflexed. *Flowers* ½–1 in. diam., rose-purple or white; perianth flat; lip boat-shaped. *Capsule* ½–¾ in., elliptic, turgid in the middle. *Seeds* many, shortly oblong, smooth, nearly black, shining.—The Linnean type is a straight broad-leaved form, but the narrow-leaved occurs in China.

11. **I. Griffithii,** *H. f. & T. in Journ. Linn. Soc.* iv. 120; lower leaves opposite petioled uppermost sessile whorled in threes, all narrow linear-lanceolate, sepals ovate-oblong acuminate, standard broad obcordate spurred behind, wings broadly 2-lobed, spur long filiform.

EASTERN PENINSULA; Mounts Ophir and Gerai, &c., alt. 3000 ft., near Malacca, *Griffith*, &c.

A beautiful species, closely allied to *I. chinensis*, but very distinct in the foliage, all the leaves being narrowed at the base, and the upper in threes; they are 1½–4 in. long, rather thick, whitish beneath, glabrous and somewhat hairy on the upper surface, as is the stem sometimes, teeth remote, lower setaceous. *Pedicels* solitary, very rarely in pairs. *Flowers* 1 in. diam., perianth flat, rose-lilac. *Capsule* unripe, like that of *I. chinensis.*

12. **I. Gardneriana,** *Wight Ic.* t. 1050; nearly glabrous, stem creeping at the base, leaves whorled in threes sessile or shortly petioled ovate-oblong acute sharply serrate, sepals short, standard obovate apiculate dorsally winged, wings 2-lobed, lobes similar obovate retuse, lip boat-shaped with a long slender spur. *H. f. & T. in Journ. Linn. Soc.* iv. 121.

Pastures below Sisparah in the western slopes of the NILGHIRI MTS., *Wight & Gardner.*

Stem procumbent at the base and rooting, simple, ascending. *Leaves* 1½–2 in., distinctly petioled, very sharply serrate, ciliate towards the base. *Peduncles* longer than the leaves, filiform. *Sepals* ovate, acuminate; wings very short and subequally 2-lobed, neither of the lobes clawed, the terminal rather the larger. *Capsule* oblong, small, pointed, glabrous.—I have seen no specimens of this plant; that so named in Wight's Herbarium and distributed from it (No. 312) is an opposite-leaved species, with a very short spur, and wholly differently shaped wings.

13. **I. setosa,** *H. f. & T. in Journ. Linn. Soc.* iv. 123; stem branched, leaves all opposite or uppermost whorled most of them long petioled elliptic-lanceolate acuminate distinctly serrulate, upper sessile with long cilia at the base, stipules of many setæ, standard suborbicular with a dorsal wing, wings broad, spur very slender.

Mountains of MALABAR; Agamalay, near Palaghautcherry, *Wight;* Sisparah Ghat, alt. 3–4000 ft., *Beddome.*

A tall erect branched annual, 1–2 ft. high; stems below as stout as a goose-quill, quite glabrous, minutely dotted with black; branches opposite. *Leaves* 2–4 in., the lower on petioles ½–1 in.; petiole and both surfaces sparsely pubescent, margins at the base and stem at the upper nodes with long cilia. *Pedicels* quite glabrous, solitary or twin, slender, equalling the leaves. *Flowers* 1 in. diam.; perianth rotate, violet-purple; sepals rather large, ciliate, apiculate; standard suborbicular, with a broad dorsal wing; wings broad, 3-lobed?; spur curved upwards. *Capsule* (diseased) 1 in. long, terete, very slender.

14. **I. Kleinii,** *W. & A. Prodr.* 140; slender, branched, nearly glabrous, leaves all opposite usually petioled elliptic-lanceolate or oblong or obovate acute or acuminate distantly serrulate, pedicels glabrous, stipules of 2 glands or obsolete, flower small, sepals linear-subulate, standard small

orbicular, wings with long claws broadly obovate almost entire, spur slender, capsule narrow. *Wight Ic.* t. 884; *H. f. & T. in Journ. Linn. Soc.* iv. 122; *Dalz. & Gibs. Bomb. Flor.* 43. I. tenella, *Wall. Cat.* 4746 B. Balsamina minor, *DC. Prodr.* i. 686.—*Rheede Hort. Mal.* ix. t. 50, 51.

Mountains of the WESTERN PENINSULA, from the Concan southwards, common in the rains.

A slender herb, rarely 1 ft. high; branches opposite, spreading. *Leaves* 1–2½ in., very variable, glabrous or pilose above, glaucous beneath, rarely sessile, usually narrowed into a slender petiole. *Pedicels* slender, solitary or twin, reflexed in fruit. *Flowers* ½ in. diam., violet-purple; spur hardly exceeding the flower or longer, more or less ascending. *Capsule* ½ in., ellipsoid-lanceolate. *Seeds* few, subglobose, black, shining.—The small flower, long spur, entire clawed wings, and small capsule with few globose seeds together best distinguish this variable plant. I never find the pedicel to have a line of pubescence as in *I. tenella* and *inconspicua*.

15. **I. diversifolia,** *Wall. Cat.* 4749; diffuse with ascending branches, quite glabrous, leaves all opposite faintly serrate lower shortly petioled elliptic or oblong obtuse, upper sessile linear-oblong or ligulate base cordate, sepals linear acuminate, standard small, wings broadly semi-obovate, spur long filiform. *W. & A. Prodr.* 139; *H. f. & T. in Journ. Linn. Soc.* iv. 121. I. heterophylla, *Wall. Cat.* 4748 B. I. Arnottiana, *Miq. in Herb. Hohenack.* 275.

WESTERN PENINSULA, from CANARA to MALABAR, *Heyne*, &c.; Quilon, *Wight;* Bababoodan hills, *Law.*

Stems very succulent, a foot or more long, rooting at the nodes. *Leaves* ½–3 in., the lower smallest and usually petioled, upper often dilated at the base, serratures rarely well defined, all very flaccid when dry; stipules obscure, glandular. *Pedicels* solitary or twin, with a faint line of pubescence, usually longer than the leaf, deflexed in fruit. *Flowers* ¾ in. diam.; perianth rosy, rotate; spur ascending, sometimes thick, inflated, equalling or exceeding the flower. *Capsule* ⅓ in., ellipsoid, turgid. *Seeds* globose, dark brown, smooth, shining.—Copious specimens in Wight's Herbarium prove this to be a very variable plant, sometimes of considerable size, and not the small species it was assumed to be in the Linnean Journal. Some specimens, probably gathered in marshy places, have very thick succulent stems and large leaves, flaccid when dry, and others are very slender with leaves not ¼ in. in breadth.

16. **I. ligulata,** *Bedd. in Madr. Journ.* ser. 2, iv. 67, t. 7, f. 6; *Ic. Pl. Ind. Or.* p. 30, t. 149; branched, erect, glabrous, leaves uniform subsessile linear-ligulate mucronate base cordate remotely serrate hispid above, stipules setaceous or 0, pedicels with a pubescent line, sepals linear-lanceolate, standard small, lateral wing-lobes broad almost hatchet-shaped, terminal very slender descending into the spur, spur as long as the flower stout incurved.

Mountains of TRAVANCOR and MALABAR, alt. 1–2500 ft., *Beddome.*

Stem 1–2 ft.; branches slender, spreading. *Leaves* 3–4 in., horizontal, very uniform in all the specimens, though probably the species occurs with broad and petioled lower leaves. *Pedicels* 1 or more, very slender, about half the length of the leaves. *Flowers* about 1 in., pink or white; standard with a dorsal pubescent line; spur undulate. *Capsule* ellipsoid, swollen in the centre. *Seeds* about 12, glabrous, shining.—When dry it is difficult, except by the spur, to distinguish this from narrow-leaved states of *I. inconspicua, tenella,* and *oppositifolia;* and, except from the breadth of the spur, from *I. diversifolia*, it being difficult to make out the curious structure of the 2 wing-lobes (that descend into the spur), except on fresh specimens. According to Beddome's figure it is the terminal lobes that are reduced to narrow ligulæ and descend into the spur; but as far as I can make out from dried specimens, it is the lateral lobes; they are filiform, much longer and more slender than Beddome represents, and dilated at the apex.

** *Spur shorter than the flower or* 0.

17. **I. tenella,** *Heyne in Wall. Cat.* 4746 A; small, slender, erect, glabrous, leaves all opposite sessile or shortly petioled ligulate oblong or lanceolate remotely serrate, stipules obscure or 0, pedicels with a line of pubescence, sepals linear acuminate, standard short, terminal lobe of wing clawed elongate lateral small, spur shorter than the flower, capsule clavate pointed few-seeded. *W. & A. Prodr.* 140; *H. f. & T. in Journ. Linn. Soc.* iv. 123. ? I. rosmarinifolia, *Retz; Wight Ic.* t. 750. I. tenuicula, *Steud. Nom. ed.* 2, i. 804.

Mountains of MALABAR, *Heyne;* and the CONCAN, *Jacquemont.*

Stem 4–10 in., simple or sparingly branched. *Leaves* 1–4 in., the upper or all narrow, sessile with a subcordate base, the lower (rarely all) usually narrow lanceolate and petioled. *Pedicels* 1–3, solitary or fascicled, capillary, erect horizontal or deflexed in fruit. *Flowers* about ½ in., pink? *Capsule* glabrous, ⅓ in., straight, long-beaked. *Seeds* few, orbicular, compressed, shining, black.—A very obscure plant, probably a variety of *I. Kleinii*, intermediate between it and *I. inconspicua*. There is a specimen in Rottler's Herbarium, marked *I. longiflora*, Heyne, from Bababud. Wight's *I. rosmarinifolia?* has a very short spur.

VAR. *brachycarpa;* spur very slender as long as the flower, capsule shorter ¼ in. ellipsoid acute at both ends. *Herb. Wight.*—Cochin, *Johnstone*, Mysore, *Lobb.* Leaves 4 in. long, ligulate from a cordate sessile base in Cochin specimens.

18. **I. inconspicua,** *Benth. in Wall. Cat.* 4741; flaccid, glabrous, much branched from the base, leaves serrate lower ovate or oblong and petioled upper linear sessile or all ovate or all linear, stipules setaceous or 0, pedicels very slender shorter than the leaves with a line of pubescence, sepals linear-subulate, wings with a broadly rhomboid obovate clawed terminal lobe and small lateral lobe, lip saccate acuminate not spurred. *W. & A. Prodr.* 139; *Wight Ic.* t. 970; *Dalz. & Gibs. Bomb. Fl.* 43. I. pusilla, *Heyne in Wall. Cat.* 4745; *H. f. & T. in Journ. Linn. Soc.* iv. 122. I. filiformis, *W. & A. Prodr.* 140. I. mysorensis, *Roth in Wall. Cat.* 4743 *in part.* I. Perrotettii, *Turcz in Bull. Soc. Nat. Mosc.* 1863, i. 594.

Mountains of the Western Peninsula, from the CONCAN to MALABAR; common at 3–8000 ft.

Stems 4–12 in., robust or slender, erect. *Leaves* ½-4 in., upper always narrowed and most remotely serrate, often very slender, glabrous or pubescent above, pale or glaucous beneath. *Pedicels* always with one line of pubescence, solitary or geminate, shorter than the leaf, deflexed in fruit. *Sepals* very long and narrow; wings with a large rounded almost obovate clawed terminal lobe, and small linear lateral one. *Capsule* ⅓ in., turgid in the middle, acute at both ends. *Seeds* few, almost globose, but a little compressed, black shining.—Of this very variable plant there appear to be two extreme and totally distinct forms, but the Wallichian specimens, which are all under-sized, are so bad, that I cannot satisfactorily determine to which of them any of the synonyms quoted above should apply. One of these two forms is usually shorter, and has all the leaves ½–⅔ in., petioled, ovate or ovate-lanceolate, and sharply serrate; it is the *I. inconspicua* of Wight's Icones, t. 970, *I. tenella* of Heyne, according to a specimen so named in Rottler's Herbarium, but certainly not Rottler's *tenella*. The other extreme form is much larger, with leaves 1½–2 in., narrow-ligulate, remotely serrate, often rounded or subcordate at the base; this is the *I. filiformis* of Wight's Herbarium, but differs from the description in Wight and Arnott in the pedicels not being confined to the uppermost leaves. *I. mysorensis*, Wall. Cat. 4743 B, is a very small state of *inconspicua* and not the true plant. *I. ramosissima*, Dalz., referred in the Journ. Linn. Soc. to *I. tomentosa*, Dalz., is another form, with a minute rudimentary spur. Between the extreme forms there are innumerable connecting links; and I retain the name *inconspicua*, as the most applicable, the flowers being amongst the smallest of the genus. Beddome adopts the synonymy of the Prodromus for *I. inconspicua*, and says that he does not know *I. tenella* (Ic. Pl. Ind. Or. p. 32). Upon the whole, I am disposed to separate the varieties as follows:—

VAR. 1. *inconspicua proper;* stem 4–8 in. usually more robust, leaves ovate or ovate-lanceolate petiolate strongly serrate, peduncles usually short. I. inconspicua, *Wight Ic.* t. 970.

VAR. 2. *pusilla;* smaller, lower leaves more or less petioled lanceolate and serrate, upper longer narrow subsessile remotely serrate. I. pusilla, *Heyne in Wall. Cat.* 4745.

VAR. 3. *filiformis;* slender and much branched, leaves subsessile very long slender remotely serrate the lower sometimes petioled and lanceolate. I. filiformis, *W. & A. Prodr.* 140 (a small few-flowered form).

VAR. 4. *ramosissima;* robust, much branched, leaves uniform short sessile oblong obtuse at both ends, lip with a very minute spur. *I. ramosissima,* Dalz. in Hook. Kew Journ. Bot. iii. 230.

19. **I. oppositifolia,** *Linn.;* erect, leaves subsessile narrow-linear elongate remotely serrate, or the lower oblong or linear-oblong and petioled, stipules subulate, pedicels quite glabrous, sepals linear acuminate, wings with a broadly-obovate clawed terminal lobe and a small lateral one, lip conical ending in a short stout incurved spur. *Wight Ic.* t. 883; *W. & A. Prodr.* 139; *Dalz. & Gibs. Bomb. Fl.* 43; *H. f. & T. in Journ. Linn. Soc.* iv. 121. I. rosmarinifolia. *Retz. Obs.* v. 29; *Arn. in Hook. Comp. Bot. Mag.* i. 325. Balsamina rosmarinifolia *and* oppositifolia, *DC. Prodr.* i. 686.

Mountains of MALABAR, CANARA, and the CONCAN, alt. 3–5000. CEYLON, abundant from the sea-level to 7000 ft., *Thwaites.*

This is another plant so closely allied to *I. tenella* and *inconspicua,* that I do not see how they are always distinguishable, in a dried state at any rate, except by the spur and glabrous pedicels. Ceylon specimens are remarkably uniform, 12–18 in., erect, simple or sparingly branched, stipulate with very narrow leaves 1½–3 in., flowers ½–¾ in. long (from standard to tip of wings), and a short stout incurved spur; but Peninsular specimens have more often broadly oblong shortly-petioled leaves, sometimes rounded at the tip. Rottler's specimens are excessively slender and flaccid. The spur is tolerably uniform in all, being horned, and the peduncles invariably glabrous; the capsule and seed are quite like those of *I. inconspicua.* I had (in Linn. Journ.) referred to this Wight's figure of *I. rosmarinifolia,* t. 750, which I am now disposed to refer to *I. tenella* or *inconspicua.*

20. **I. reticulata,** *Wall. Pl. As. Rar.* 19, t. 19; *Cat.* 4750; glabrous, stem erect from a creeping base fleshy simple or branched, leaves all opposite upper subsessile linear-oblong acute cuspidate-serrate base retuse, lower often shortly petioled, sepals narrow linear, standard ovate acute, wings clawed, claw with a hooked process (lateral lobe) on each margin, terminal lobe orbicular clawed, lip funnel-shaped narrowed into a short incurved spur.

PEGU near Rangoon, *Wallich;* MOULMEIN, *Lobb.*

Stem 6–12 in.; branches opposite or alternate, obscurely 4-angular. *Leaves* 1–1½ in.; lower often narrow-obovate acute. *Flowers* ½ in. diam., rosy, nodding; fruiting peduncles deflexed. *Capsule* ½ in., ellipsoid, turgid in the middle, narrowed at both ends and beaked at the apex, glabrous. *Seeds* few, subglobose, testa black shining.—Very nearly allied to *I. oppositifolia,* with which I have confounded it in Journ. Linn. Soc.; but the character of the 2 small lateral falcate recurved lateral lobes on each wing, is very remarkable. I describe them from Wallich's figure, and assume Lobb's plant to be the same, a point which can only be determined from living specimens.

21. **I. Lawii,** *H. f. & T. in Journ. Linn. Soc.* iv. 122; erect, much branched, leaves short sessile or subsessile ovate or oblong subserrate sparsely scabrid above, stipules 0, pedicels with a line of hairs, sepals

linear-lanceolate, standard orbicular cuspidate, wings with very broadly obovate subsessile terminal and small lateral lobes, lip boat-shaped spurless. *Dalz. & Gibs. Bomb. Flor.* 43.

Bababoodan hills in MALABAR, *Law.*

Annual, 8–10 in. *Stem* rather stout, glabrous. *Leaves* ¾–1 in., smaller upwards, acute, glabrous and pale beneath, the upper often cordate at the base. *Pedicels* about equalling the leaves, sharply deflexed in fruit. *Flowers* ¾ in. diam. across the wings. *Capsule* ⅓ in., ellipsoid, acute at both ends. *Seeds* few, unripe, apparently as in *I. Kleinii.*—Very distinct from any of the preceding specimens of this section in the form of the wings.

22. **I. Dalzellii,** *H. f. & T. in Journ. Linn. Soc.* iv. 123; erect, sparingly branched, quite glabrous, robust, leaves subsessile lower elliptic-lanceolate, upper ovate or oblong-lanceolate from a broad or cordate base spinulose-serrulate, stipules 0, sepals linear-lanceolate, standard suborbicular hooded winged at the back, terminal wing-lobe clawed, lip boat-shaped with a very short spur. *Dalz. & Gibs. Bomb. Fl.* 43.

Mountains of the CONCAN, *Dalzell.*

Stem stout, 10–18 in. high. *Leaves* 3–5 in., sometimes 1½ in. broad, acuminate, basal serratures often with long cilia. *Pedicels* solitary or fascicled on a very short common peduncle, quite glabrous, shorter than the leaves, apparently not deflexed in fruit. *Flowers* about ½ in. across, yellow (structure not well made out). *Capsules* nearly ½ in., ellipsoid. *Seeds* few, very large, broadly oblong, black, shining.—A very distinct species, which differs from all of this section in the often fascicled peduncles and very large seeds.

23. **I. tomentosa,** *Heyne in Wall. Cat.* 4751; more or less tomentose, leaves nearly uniform very shortly petioled elliptic- or oblong-ovate acute or obtuse serrulate hispid above glabrous or tomentose on the nerves beneath, sepals linear-lanceolate, standard oblong, wings with a broad sessile terminal and small lateral lobe, lip saccate. *Dalz. & Gibs. Bomb. Flor.* 43; *Wight Ic.* t. 749; *H. f. & T. in Journ. Linn. Soc.* iv. 121 (*excl. syn. of* ramosissima); *W. & A. Prodr.* 139. I. rufescens, *Benth. in Wall. Cat.* 4747; *W. & A. Prodr.* 138; *Wight Ic.* t. 969.

Mountains of MALABAR and TRAVANCOR, alt. 3–7000 ft., common in swamps.

Stem 4–8 in., usually simple, erect, more or less clothed with crisped rufescent hairs above, which also appear on the pedicels and often on the nerves of the leaf beneath. *Leaves* ½–1 in., short, uniform, obtuse or acute, more or less scabrid or tomentose above; nerves beneath few. *Pedicels* always solitary, longer or shorter than the leaf, deflexed in fruit. *Flowers* very variable in size, longest diameter (⅓–½ in.) through the lip because of its being so saccate, more or less pubescent; wings short, terminal lobe rounded; lip obtusely conical. *Capsule* and *seeds* as in *I. oppositifolia,* &c.—Wight figures a short apical spur in *I. rufescens,* but I do not find it in any of the specimens, and I do not think that *tomentosa* and it are separable as permanent varieties. On the other hand, Wight's figure of *I. rufescens* differs so much from that of his *I. tomentosa,* that it seems best to rank these provisionally as varieties.

VAR. 1. *tomentosa;* flower ½ in. long from tip of lip to that of standard, wings with an oblong lateral lobe incumbent on a large terminal one, lip saccate with a short hooked spur. *Wight l.c.*

VAR. 2. *rufescens;* flowers twice as long as in var. 1, lip shortly saccate spurless. *Wight l.c.*

24. **I. concinna,** *H. f.;* small, glabrous, branches opposite, leaves uniform opposite subsessile ovate or ovate-cordate acute sharply serrate, nerves strong beneath, sepals dimidiate-lanceolate as long as the lip, standard orbicular spurred, wings 2-lobed, the terminal clawed dimidiate-

ovate, lip boat-shaped with a very short curved spur. I. Gardneriana, *Wight Herb. not of the Icones.*

Mountains of MALABAR, *Wight.*

Annual, erect, 6–10 in., rather stout; branches opposite, ascending. *Leaves* ½–¾ in., lower serratures almost setaceous; stipules setaceous or obsolete. *Pedicels* rather shorter than the leaves. *Flowers* ⅓ in. diam., remarkable for the length of the sepals, apparently purple. *Capsule* erect, ⅓ in., acute at both ends, very turgid in the middle. *Seeds* very few and large, subcompressed, rather broader than long, testa black shining. —This has much the habit of *I. tomentosa*, but it is glabrous with ovate very acutely serrate leaves, and different flowers. The pedicels show no disposition to be deflexed.

25. **I. salicifolia,** *H. f. & T. in Journ. Linn. Soc.* iv. 124; erect, stout, tomentose, leaves shortly petioled lanceolate serrate all opposite or lower opposite upper whorled, peduncles solitary or fascicled on a common peduncle sometimes 2-flowered, stipules subulate or 0, flowers large, sepals subulate-lanceolate, standard obovate keeled, lip deeply saccate with a short stout hooked spur.

KHASIA MTS., alt. 3–4000 ft., *Griffith*, &c.

Stem stout, 1–2 ft., with spreading opposite branches. *Leaves* 2–5 in., acuminate at both ends, membranous, tomentose or glabrate on both surfaces, serratures small, the basal long-ciliate. *Inflorescence* very variable, of slender 1-flowered pedicels that are solitary or fascicled or collected into a many-flowered axillary cyme, with subulate bracteoles. *Flowers* dark purple, nearly triangular in profile, and ⅔ in. from the tip of the spur to that of the standard. *Capsule* ⅔ in., elliptic-lanceolate. *Seeds* immature.—*I. salicifolia,* Turcz., published in the Moscow Bulletin in the year previous to this (in the Linnean Journal, 1860) is, I suspect, *I. Balsamina.*

A III.—SUBVERTICILLATÆ.

* *Peduncles 1-flowered. See* I. parvifolia *in* **.

26. **I. latifolia,** *Linn.*; tall, stout, erect, branched, quite glabrous, leaves subopposite and whorled petioled ovate-lanceolate crenate, sepals ovate cuspidate, standard broad 2-lobed spurred behind, wings broad 2-lobed, lip boat-shaped, spur long slender straight or incurved. *Wall. Cat.* 4737; *W. & A. Prodr.* 138 *in part; Dalz. & Gibs. Bomb. Fl.* 44; *H. f. & T. in Journ. Linn. Soc.* iv. 124 (*excl. some syn.*); *Miq. Ill. Flor. Arch. Ind.* 93. I. cuspidata, *W. & A. in Hook. Comp. Bot. Mag.* i. 321; *Wight Ic.* t. 741; *Thwaites Enum.* 65. Balsamina latifolia, *DC. Prodr.* i. 686.—*Rheede Hort. Mal.* ix. t. 48.

Mountains of the WESTERN PENINSULA, from CONCAN to TRAVANCOR, alt. 3–7000 ft.; CEYLON, alt. 4–7000 ft.—DISTRIB. Java, fid. *Miquel.*

A robust plant, annual? 2–3 ft. high; stem as thick as the finger below, branches alternate. *Leaves* membranous, 2–5 in., acuminate, base always acute, crenatures often setose. *Flowers* 1–1¾ in. diam., pale purple, perianth rotate. *Standard* larger than the wings, which have a large retuse basal and narrower terminal lobe; lip green, as is the spur. *Capsule* 1 in., elliptic, turgid, quite glabrous. *Seeds* few, large, oblong, compressed; testa thick, opaque, reticulate.—A Nilghiri specimen of Gardner's has long cilia on the petiole and alternate leaves. Thwaites remarks the variability of the large lobes of the wings. I have not cited under this the *I. latifolia* of Bot. Mag. t. 5625, which has very alternate leaves, and must hence be referred to *I. flaccida.* These species are undistinguishable in herbarium specimens, though so different in the seeds.

27. **I. Leschenaultii,** *Wall. Cat.* 4739; almost shrubby, leafy, glabrous, leaves opposite and alternate spreading and recurved petioled ovate-lanceolate acuminate base acute crenate, sepals ovate acuminate,

standard 2-lobed spurred at the back, wings 2-lobed, lip boat-shaped, spur slender incurved. *W. & A. Prodr.* 136; *Wight Ic.* t. 970, *bis; H. f. & T. in Journ. Linn. Soc.* iv. 125. Balsamina Leschenaultii, *DC. Prodr.* i. 686.

Mountains of MALABAR and TRAVANCOR, alt. 3–7000 ft.

A very near ally of *I. latifolia*, but I think distinct, especially in the excessively branched and leafy habit, much smaller, crowded, usually recurved leaves, and smaller flowers and capsules. De Candolle is, no doubt, wrong in assigning Ceylon as a habitat, except, indeed, he took *I. latifolia* for this. Leschenault, its discoverer, collected in the Peninsula.

28. **I. lucida,** *Heyne in Wall. Cat.* 4738; nearly glabrous, flaccid, stem very slender, leaves chiefly opposite and whorled petioled ovate or ovate-lanceolate acuminate crenate, peduncles very slender, flowers small, sepals ovate acuminate, standard suborbicular beaked entire, wings 2-lobed, lip boat-shaped with a long incurved slender spur. I. latifolia, *W. & A. Prodr.* 138.

Mountains of the WESTERN PENINSULA, from the CONCAN to MALABAR.

Numerous specimens of this from Law, Stocks, Wight and others, show it to be a very different species from *I. latifolia*, being much smaller in all its parts, 4–8 in. high, sparingly branched, very slender and flaccid; with a small flower ⅓ in. diam., and a small entire orbicular standard. The crenatures of the leaf, which is sparsely hairy above, are rarely setigerous. A specimen in Rottler's Herbarium bears the name *lucida*, Heyne, and station Courtallum, spelled Kuttalam. This may be a form of *I. flaccida*, with the leaves sometimes opposite.

** *Peduncles* 2–∞ *rarely* 1-*flowered. See* I. fimbriata *and* janthina *in* A vii.

29. **I. radicans,** *Benth. in Wall. Cat.* 4763; pubescent, stem simple erect leafy, leaves opposite subsessile stipulate lanceolate acuminate serrate, peduncles horizontal, flowers 1–4 large, standard galeate, wings small, lip saccate obtuse, spur short hooked. *H. f. & T. in Journ. Linn. Soc.* iv. 126.

KHASIA MTS., in marshes, alt. 4–6000 ft., *Wallich, Griffith,* &c.

A beautiful species, 10–18 in., more or less crisply hairy on the stem and leaves above, rarely glabrate. *Stem* square. *Leaves* 1–3 in., sometimes ovate- or oblong-lanceolate, the serratures often ciliate, pale beneath; stipules of 2 fascicles of soft gland-tipped setæ. *Peduncles* slender, shorter than the leaves, with as many lanceolate bracteoles as there are pedicels. *Flowers* nearly 1 in. across and as deep, purple; sepals very variable, dimidiate-ovate or lanceolate, straight or falcate; standard with a dorsal conical obtuse horn or gibbosity; wings 2-lobed; lip very obtuse, longer than broad; spur incurved. *Capsule* ¾ in., glabrous, ellipsoid, turgid in the middle. *Seeds* oblong, compressed; testa pale, membranous.

30. **I. trilobata,** *Coleb. in Hook. Exot. Flor.* ii. t. 141; tall, alternately branched, almost glabrous, leaves opposite and alternate all or the lower only long-petioled lanceolate or ovate-lanceolate crenate-serrate stipulate, peduncles horizontal, flowers 2–5 large, sepals minute subsetaceous, standard obcordate, lip saccate obtuse or conical, spur long or short. *Wall. Cat.* 4762 A, and 4763 (Pundua); *H. f. & T. in Journ. Linn. Soc.* iv. 126.

Tropical SIKKIM HIMALAYA, alt. 2–4000 ft., and KHASIA MTS., alt. 3–5000 ft.

A very variable and beautiful species, 1–2 ft. *Leaves* membranous, sparsely hairy above, lower 2–5 in. usually long-petioled elliptic-lanceolate long-acuminate crenate, the upper more often sessile lanceolate or oblong-lanceolate, all often ciliate towards the base; stipules usually of large tufts of soft cilia. *Peduncles* very slender, shorter than the leaves; bracts minute or 0. *Flowers* ½–¾ in. from base of lip to tip of standard, which is horned at the back, bright violet-purple; wings 2-lobed, but not deeply, notched on the inner margin, lobes rounded-oblong, sometimes elongate; lip very variable, sometimes conoid and produced into a slender curved spur, at others obtuse, abruptly spurred, or gibbous above the spur. *Capsule* and seeds as in (92) *I. tripetala.*—The figures in the Exotic Flora represent etiolated flowers.

31. **I. flavida,** *H. f. & T. in Journ. Linn. Soc.* iv. 127; erect, quite glabrous, leaves opposite and 3-nately whorled all long-petioled ovate-lanceolate minutely serrulate, stipules obsolete, flowers 2–4-subumbelled yellow, bracts recurved, standard obovate, wings small, lip saccate obtuse, spur stout incurved. *Wall. Cat.* 4763 (*with* I. trilobata).

Eastern Bengal; Silhet and Cachar, in woods, *Wallich*, &c.; Mishmi Mts. and Upper Assam, *Griffith.*

A branched annual, not easily distinguished in a dried state from states of *I. trilobata*, except by the leaves being more constantly quite glabrous above, the stipules being obsolete, and the leaves not ciliate towards the base. *Peduncles* often opposite and usually erect; bracts apparently always recurved. *Flowers* $\frac{3}{4}$ in. from the base of the lip to the tip of the standard, dirty gamboge-yellow; spur thick, hooked; wings with 2 rounded lobes, the terminal purplish.

32. **I. verticillata,** *Wight in Madr. Jour.* v. 15; glabrous, erect, leaves opposite and in whorls of 3 and 6 short-petioled narrow-lanceolate, stipules subulate, flowers umbelled, wings broad 2-lobed, terminal lobe elongate, lip boat-shaped with a long very slender spur. *H. f. & T. in Journ. Linn. Soc.* iv. 129.

Mountains of Malabar; in gravelly beds of streams, at Sivagherry, *Wight;* Cochin, *Johnstone.*

Herbaceous, diffuse: stem 6–18 in., subsimple, naked below, swollen at the joints, terete. *Leaves* 4–6 in., usually 4–6 in a whorl, much narrowed at both ends, ciliate-serrate. *Peduncles* shorter than the leaves, 2–∞-flowered, bracts subulate. *Flowers* $\frac{2}{3}$ in. diam., crimson, perianth subrotate; standard suborbicular-oblong; wings deeply 2-lobed, terminal lobe elongate, dimidiate-oblong; lip boat-shaped; spur $\frac{3}{4}$–1 in., nearly straight or with an incurved tip, very slender indeed. *Capsule* erect or inclined (oblong obtusely 5-angled, *Wight*).

33. **I. Goughii,** *Wight Ill.* i. 160; *Ic.* t. 1603; small, slender, quite glabrous, leaves mostly opposite petioled ovate crenate-serrate, peduncles capillary viscid exceeding the leaves 4–6-flowered, flowers minute, standard obovate retuse, wings 2-lobed, lobes short truncate and retuse, lip boat-shaped with a straight spur shorter than the flower. *H. f. & T. in Journ. Linn. Soc.* iv. 130. I. pulniensis, *Bedd. in Madr. Journ.* iii. 176. I. anamallayensis, *Bedd. in Madr. Journ* N.S. iv. 68, t. 7, f. 8; *Ic. Pl. Ind. Or.* 30, t. 150. I. circæoides, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1863, i. 594.

Mountains of Malabar and Travancor; Nilghiri Mts. at Pycarrah, *Gough;* Anamallay and Pulney Mts. by streams, alt. 7–8000 ft., *Beddome.*

A very slender glabrous simple or branched annual, 4–8 in. high, supporting itself amongst herbage (*Wight*). *Leaves* $\frac{1}{3}$–$\frac{2}{3}$ in., petiole half as long or longer, subacute, base rounded, nerves few, serratures not ciliate; stipules obsolete. *Peduncles* terminal, often numerous. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in. diam., 4–8, umbelled, pink; bracts minute, setaceous; sepals minute, falcate; standard mucronate in the retuse apex; wings with very variable lobes, the lower 2-lobed according to Beddome; spur shorter than the flower. *Capsule* $\frac{1}{10}$ in., erect, ellipsoid, acute at both ends. *Seeds* few, clothed with hairs.—Beddome (Ic. Pl. Ind. Or. p. 32) identifies his *I. viscosa* with *Goughii;* but his specimens of *I anamallayensis* are certainly identical with *Goughii*, and *viscosa* appears to me to be a different plant, with a long spur; his figure of *anamallayensis* represents a coarser plant than his specimen, with very hairy upper surface of the leaves, which, however, he describes as having but few distant hairs: he further describes it in his Icones (not in the Madr. Jour.) as having a ligulate appendage to the wings, which is hidden in the spur. The wings are probably very variable: the drawing in Beddome's Icones does not resemble that in the Madr. Journal (and neither are like Wight's figure); there is a short subulate process on their inner margin, close above the spur, which may descend into it.

34. **I. viscosa,** *Bedd. in Madr. Journ.* N.S. iv. 68, t. 7, f. 7; stem petioles and peduncles viscidly pubescent, leaves opposite long-petioled elliptic or ovate obtuse or acute subcrenate, peduncles exceeding the leaves 6–12-flowered, flowers minute umbelled, standard suborbicular, wings 2-lobed terminal lobe the largest clawed, lip conical, spur curved gibbous longer than the flower, seeds echinate.

Anamallay hills in MALABAR, alt. 3500 ft., *Beddome.*

Probably a variety of *I. Goughii*, from which it differs in the stem and branches and sometimes the leaves being viscid, the usually larger size, faint crenatures of the leaves, longer spur, and (according to Beddome) the echinate ripe seeds which are matted with hair when young. The wings are, as usual, very variable, sometimes exactly as in Wight's figure of *Goughii*, and there is, as in that plant, a subulate process on their inner margin close to the base, which is hidden in the lip.

35. **I. parvifolia,** *Bedd. in Madr. Journ.* N.S. iv. 66, t. 7, f. 1; *Ic. Pl. Ind. Or.* 29, t. 142; glabrous, small, stem very slender branched, leaves alternate and opposite very small ovate coarsely crenate-serrate, peduncles axillary much longer than the leaves, flowers 3–5 very small racemose, standard suborbicular, wings with a large triangular terminal lobe, lip boat-shaped, spur short blunt, seeds villous.

MALABAR; on rocks at the top of the Akka Mts., alt. 8–8600 ft., *Beddome.*

Much the smallest known species. *Stem* 3–6 in., apparently prostrate. *Leaves* ⅙–⅓ in., opposite and alternate, sessile or petioled, the lower usually opposite and upper alternate *Peduncles* very stout and long for the size of the plant, often 1–1½ in., spreading, axillary, solitary; bracts minute. *Flowers* ⅓ in. diam., pale pink with a crimson blotch on the wing; sepals falcate; standard small, vaulted; wings with a small upper and large terminal lobe; lip greenish. *Capsule* apparently as in *I. Goughii.*—Description taken chiefly from Beddome. In the Kew specimens the peduncles are almost always single-flowered.

36. **I. circæoides,** *Wall. Cat.* 4772; small, glabrous, stem simple, leaves few opposite long-petioled broadly ovate subserrate, peduncle solitary filiform, flower subracemose, sepals orbicular acuminate, standard small, wings large, lip concave, spur very short. *H. f. & T. in Journ. Linn. Soc.* iv. 130.

TENASSERIM, at Tavoy, *Wallich;* PEGU, *M'Clelland.*

Stem very slender and quite simple, 4–6 in. *Leaves* 2–4 pairs, 2 by 1¼–1½ in., glabrous, with a few scattered hairs on both surfaces, glaucous beneath, acute, serratures subciliate, nerves many slender; petiole very slender; stipules obscure, glandular. *Peduncle* shorter than the leaf; bracts small, ovate; pedicels short. *Flowers* about ⅕ in. diam., white?; sepals green; terminal lobe of wing long-clawed, pendulous. *Capsule* short.—The above is an imperfect description, the specimens being very indifferent.

A IV.—UNIFLORÆ.

* Spur much shorter than the flower or 0, sometimes longer in *I. Balsamina*, and *I. leptopoda.*

37. **I. Balsamina,** *Linn.;* pubescent or glabrate, leaves petioled narrow-lanceolate acuminate deeply serrate, petiole glandular, flowers rose-coloured, sepals broad-ovate minute, standard orbicular retuse, wings very broad lateral lobe much rounded, terminal sessile very large, lip small conoid, spur short or long and slender incurved, capsule tomentose. *W. &*

A. Prodr. 135; *H. f. & T. in Journ. Linn. Soc.* iv. 130; ?I. Lobbiana *and* salicifolia, *Turcz. in Bull. Mosc.* 1859, i. 270, 271.

Throughout tropical and subtropical INDIA and CEYLON.—DISTRIB. Malay Islands and China.

The common garden Balsam is a very variable plant in habit, pubescence, size and colour of flower, breadth of leaf, shape of lip, and length of spur. *Capsule* ⅓–½ in., ellipsoid, narrowed at both ends, densely tomentose or woolly. *Seeds* globose; testa black, opaque, tubercled.

VAR. 1. *vulgaris;* tall, leaves broadly lanceolate, flowers large, spur short. I. Balsamina, *Linn.; Roxb. Fl. Ind.* i. 651; *Wall. Cat.* 4731. Balsamina hortensis, *DC. Prodr.* i. 685.—*Rheede Hort. Mal.* ix. t. 52.

VAR. 2. *coccinea;* leaves narrow-lanceolate, flowers medium-sized, spur long and slender. I. Balsamina, *Dalz. & Gibs. Bomb. Fl.* 44. I. coccinea, *Wall. Cat.* 4732; *Bot. Mag.* 1256. I. cornuta, *Linn.; Wall. Cat.* 4733. I. longifolia, *Wight in Wall. Cat.* 4734. Balsamina coccinea *and* cornuta, *DC. Prodr.* i. 685-6.

VAR. 3. *arcuata;* diffusely branched, leaves small narrow-lanceolate, flowers small, spur long slender arcuate. I. arcuata, *Wall. Cat.* 4785; *W. & A. Prodr.* 136.—Western Peninsula.

VAR. 4. *macrantha;* small, 4 in., leaves ovate-lanceolate, flower large, spur short.—Western Peninsula.

VAR. 5. *micrantha;* small, stem simple, leaves small ovate-lanceolate, flowers small, spur long slender.—Western Peninsula.

VAR. 6. *rosea;* tall, leaves linear-lanceolate, flowers rather small, lip saccate, spur short incurved. I. rosea, *Lindl. Bot. Reg.* 1841, t. 27.—Western Himalaya.

38. **I. scabriuscula,** *Heyne in Roxb. Fl. Ind. ed. Carey*, ii. 464; short, erect, branched, tomentose, leaves petioled lanceolate or obovate serrate, peduncles short, sepals minute, standard orbicular winged, wings 2-lobed, lip boat-shaped tomentose, spur 0. *Wall. Cat.* 4729, 4736, *in part; Arn. in Hook. Comp. Bot. Mag.* i. 322; *Bedd. Ic. Pl. Ind. Or.* 29, t. 144; *H. f. & T. in Journ. Linn. Soc.* iv. 131.

Mountains of MALABAR, from the Southern Concan to Wynaad and Kurg, alt. 2–4000 ft.

Usually much branched from the base, 4–10 in. high. *Leaves* uniform, 1–2 in.; petiole hardly glandular, variable in length. *Peduncles* short, scabrid. *Flowers* ½ in. diam., pink; sepals, lip, and standard usually very hairy. *Capsule* ⅓ in. long, ellipsoid, mucronate, villous. *Seeds* few, globose; testa opaque, dark brown, tubercled.

39. **I. glandulifera,** *Arn. in Hook. Comp. Bot. Mag.* ii. 322; almost shrubby, leaves subterminal 4–8 in. glabrous ovate or elliptic-lanceolate acuminate serrulate, petiole very long glandular, flowers fascicled axillary and shortly pedicelled, sepals subulate, standard orbicular 2-lobed spurred behind, wings 2-lobed lateral lobe small rounded, terminal broad half-obovate pendulous, lip saccate hairy, spur short minute. *Thwaites Enum.* 66; *H. f. & T. in Journ. Linn. Soc.* iv. 131. I. cornigera, *Hook. Bot. Mag.* t. 4623, *not of Arnott.*

Central province of CEYLON, alt. 4–6000 ft.

Stem 2–3 ft., very robust. *Leaves* glabrous on both surfaces, serratures very small ciliolate and setigerous; petiole 1–3 in., usually with pedicelled glands. *Flowers* rose-coloured, 1½ in. long; pedicels pubescent, short; standard with a large green spur behind; lip sometimes conoid and almost glabrous; spur involute. *Capsule* unknown.

40. **I. macrophylla,** *Gardner in Bot. Mag.* t. 4662; almost shrubby, stem very thick, leaves subterminal 6–16 in. usually pubescent beneath ovate or lanceolate acuminate serrate, petiole very long glandular, flowers mostly fascicled on the stem below the leaves shortly pedicelled, sepals

minute, standard small elliptic acuminate with a long beak, wings very small 2-lobed included in the lip, lip saccate, spur short involute. *H. f. & T. in Journ. Linn. Soc.* iv. 132. I. glandulifera var.? *Arn. in Hook. Comp. Bot. Mag.* i. 323.

Mountains of CEYLON, alt. 5–7000 ft.

Stem as thick as the thumb, 10–12 ft. high, naked below. *Leaves* very like those of *I. glandulifera*, but even larger, and petioles as in it, with pedicelled glands. *Flowers* ¾ in. long, orange-red, quite glabrous, with a remarkably small beaked standard and wings. *Capsule* ⅓ in., very turgid, straight, beaked, quite glabrous. *Seeds* not ripe.—A noble species in habit and foliage.

41. **I. repens,** *Moon Cat.* 18; glabrous, creeping, diffusely branched, leaves long-petioled ovate cordate or reniform, pedicels very long, standard orbicular spurred behind, wing-lobes short broad, lip subconoid, spur short incurved. *Wight Ill.* i. 160, t. 61; *Hook. Bot. Mag.* t. 4404; *H. f. & T. in Journ. Linn. Soc.* iv. 132.

Southern and Central parts of CEYLON, at no great elevation.

A slender creeping much branched and perfectly glabrous plant. *Leaves* ½–¾ in. diam., acute; petiole 1 in. *Flowers* yellow, ¾ in. diam. *Capsule* and seeds unknown.

42. **I. leptopoda,** *Arn. in Hook. Comp. Bot. Mag.* i. 321; erect, branched, quite glabrous, slender, leaves long-petioled ovate or lanceolate acuminate crenate-serrate, pedicels long axillary subsolitary, flowers small, standard obcordate spurred at the back, wings 2-lobed broad horizontal, lip boat-shaped, spur long or short. *Thwaites Enum.* 65; *H. f. & T. in Journ. Linn. Soc.* i. 132. I. brevicornu *and* I. gibbosa, *Arn. l.c.*

Mountain woods of CEYLON, alt. 5–8000 ft.

A flaccid variable herb, 1–3 ft. high; stem often prostrate and rooting at the base, sometimes almost woody below. *Leaves* 1–3 in., membranous, sometimes ciliate towards the base, young usually puberulous, nerves many; petiole very variable in length, sometimes with stipitate glands. *Flowers* about ½ in. diam.; pedicels very slender; perianth rotate, rosy; sepals small, oblong-lanceolate; lobes of wings subequal, flat; spur sometimes ¾ in., and very slender, at others reduced to a mere tubercle. *Capsules* ⅓–½ in., erect, ellipsoid, beaked. *Seeds* immature.

43. **I. truncata,** *Thwaites Enum.* 66; weak, slender, diffusely branched, leaves 1–1½ in. petioled ovate or ovate-lanceolate acuminate serrate sparsely pubescent above, pedicels 1–3 slender bracteate and small, flowers pubescent, standard orbicular cuspidate, wings unequally 2-lobed spreading, lip conoid, spur short curved. *H. f. & T. in Journ. Linn. Soc.* iv. 133.

Mountain woods of CEYLON, alt. 4–6000 ft.

Closely allied to *I. leptopoda*, and probably a variety of that plant, with diffuse stems and hairy leaves peduncle and flowers, but of which Thwaites enumerates a variety, *subglabra*, which is almost glabrous. *Young capsules* pilose, *Thw.*

44. **I. pendula,** *Heyne in Wall. Cat.* 4744; very small, erect, slender, branched, almost glabrous, leaves ¼–⅓ in. petioled elliptic-ovate or subcordate acute remotely serrate, pedicels solitary fruiting deflexed, flowers minute glabrous, standard spurred at the back, lip concave not spurred. *W. & A. Prodr.* 137; *H. f. & T. in Journ. Linn. Soc.* iv. 133.

Mountains of MALABAR, at Bababood, *Heyne.*

The specimens of this do not suffice for a good description; it is evidently closely allied to *I. inconspicua*, *tenella*, and other species with minute flowers, opposite leaves and deflexed fruiting peduncles. *Stem* 4–6 in.; branches with a faint line of pubescence on one side. *Leaves* with few nerves. *Pedicels* shorter than the leaves, minutely pubescent. *Flowers* ¼ in. diam. *Capsule* ⅛ in., ellipsoid, beaked, glabrous.

45. **I. mysorensis,** *Roth Nov. Plant. Sp.* 164; stem very slender glabrous, leaves alternate petioled lanceolate acuminate remotely serrulate, pedicels 1–2 axillary, flowers very small, sepals minute, standard suborbicular gibbous at the back, terminal lobe of wing largest, lip boat-shaped, spur short straight, capsule tomentose. *Wall. Cat.* 4743 C; *W. & A. Prodr.* 137; *H. f. & T. in Journ. Linn. Soc.* iv. 133. Balsamina mysorensis, *DC. Prodr.* i. 686.

MYSORE, *Heyne.*

Stem 6–10 in. *Leaves* 1½ in., quite glabrous. *Pedicels* half the length of the leaves or less. *Flowers* red, about [illegible] in. diam.; spur about half the length of the lip, which is acuminate. *Capsule* unripe, ⅙ in. ellipsoid.—A very obscure plant, belonging apparently to the section with (18) *I. inconspicua*, but with leaves all alternate and a very tomentose capsule. Wight & Arnott, in the Prodromus quote Wight Cat. n. 979, under this species, but give no particulars, taking the description almost entirely from Roth. I find a good authentically named specimen in Rottler's Herbarium, communicated by Heyne himself in 1801, and marked *mysorensis*, nobis, in Rottler's handwriting.

46. **I. Parishii,** *H. f.*; glabrous, stem very thick and fleshy, leaves large long-petioled elliptic or ovate serrulate, pedicels solitary in the upper axils capillary, sepals very large orbicular-ovate, standard broadly orbicular, wings not lobed very obliquely trapezoid acute projecting forwards, lip small oblong concave with a basal gibbosity or very short spur.

TENASSERIM; on limestone rocks, near Moulmein, *Parish.*

The Rev. Mr. Parish describes this very curious species as a "biennial or perennial fleshy short-stemmed plant, 10–24 in. high, slightly branched, with large handsome flowers, which are single in the axils of the upper leaves;" and suggests the names for it of *lævis* or *lævicaulis*, which, not being significant in so glabrous a genus, I have ventured to replace by that of its excellent discoverer. It is described above partly from imperfect specimens communicated by himself and partly from his drawing. *Stem* as thick as the finger, short, smooth. *Leaves* 5–7 in., membranous, straight or oblique, base sometimes slightly cordate; nerves many, arched; petiole 2–3 in., slender, sometimes 2-glandular at the top. *Flowers* 2 in. long from tip of wing to that of standard, white with red streaks on the wings and lip; sepals ½–¾ in., concave, acute; wings projecting forward, the lateral lobes not distinct from the terminal, turned upward and falcate, the rest of the lobe triangular with straight inner edges and acute apex; lip very small, horizontal, the spur a gibbosity, green. *Capsule* unknown.

47. **I. capillipes,** *H. f. & T. in Journ. Linn. Soc.* iv. 135; very slender, glabrous, diffusely branched, leaves long-petioled lanceolate caudate-acuminate, crenate, pedicels 1–2 axillary capillary, flowers very small, sepals falcate, standard very long erect linear-oblong, wings short lobes rounded acuminate, lip saccate, base rounded with a short slender spur.

TENASSERIM; Moulmein, on limestone rocks, *Lobb, Parish.*

Stem 6–10 in., branches long. *Leaves* 2–5 in., very narrow, flaccid, many-nerved, narrowed into the slender naked petiole. *Pedicels* ¼–½ in., extraordinarily slender. *Flowers* white? ¼ in. from the top of the standard to the base of the spur; sepals linear, obtuse; standard remarkably long, obtuse, concave; wings lobed to the middle, lateral lobe much the largest, sides rounded, acute, tips of both lobes pointed downwards. *Capsule* ¼ in., trapezoid, acuminate, contracted at the base, like that of (87) *I. racemulosa. Seeds* unripe.

** *Spur longer than the flower.* (*See* I. Balsamina *and* leptopoda *in* *.)

48. **I. Munronii,** *Wight Ill.* i. 160; *Ic.* t. 1049; softly hairy, stem hard

flexuous branched, leaves towards the ends of the branches petioled elliptic acuminate serrulate, pedicels slender, sepals large as long as the wings, standard orbicular winged at the back, wings short 2-lobed to the middle, spur trumpet-shaped villous ending in a long stout incurved spur. *H. f. & T. in Journ. Linn. Soc.* iv. 133. I. eriantha, *Turcz. in Bull. Soc. Imp. Nat. Mosc.* 1859, i. 270.

Western Nilghiris, at Sisparah, alt. 5–7000 ft., in shady places.

Suffruticose, 1–2 ft., stem terete, somewhat woody; branches spreading, nodose. *Leaves* 1½–3 in., membranous, covered with soft scattered hairs on both surfaces, teeth small glandular, nerves faint; petiole ½–2 in., hairy. *Pedicels* ¾–1½ in., hairy. *Flowers* (white and red, *Beddome*) about ⅔ in. long; sepals very large, acuminate; wings and standard very small; spur hirsute. *Ovary* hairy. *Capsule* hairy. *Seeds* glabrous, (Wight.)

49. **I. dasysperma,** *Wight in Madr. Journ.* v. 7. t. 2; *Ic.* t. 742; herbaceous, flaccid, erect, branched, leaves petioled elliptic or ovate acuminate crenate, petiole often glandular, pedicel usually solitary slender, flowers rather small, sepals minute, standard obcordate, wings spreading deeply 2-lobed, lip boat-shaped, spur very long and slender. *H. f. & T. in Journ. Linn. Soc.* iv. 134.

Malabar, in woods and plains, ascending to 3000 ft.

Stem 1–2 ft., branches sometimes opposite. *Leaves* always alternate, 2–3 in., slightly hairy on the upper surface, glabrous beneath; crenatures large, not setigerous; petiole ½–2 in., sometimes with stipitate glands. *Pedicels* equalling or exceeding the petioles, very slender. *Flowers* ½–¾ in. diam.; standard cuspidate; wings very divergent; lobes subequal, obovate, retuse; spur incurved, exceeding the flower, very hairy. *Capsule* ⅓ in., very obliquely ovoid, turgid, glabrous, pointed at both ends. *Seeds* subglobose, hairy, numerous.

50. **I. flaccida,** *Arn. in Hook. Comp. Bot. Mag.* i. 322; slender, erect sparingly branched, glabrous, leaves petioled ovate or lanceolate crenate, sepals ovate, standard broad 2-lobed, spurred behind, wings broad 2-lobed, lip boat-shaped, spur long slender, capsule glabrous, seeds globose tubercled. *Thwaites Enum.* 65; *Hook. Bot. Mag.* t. 5276, *and* I. latifolia, t. 5625. I. bipartita, *Arn. in Hook. Comp. Bot. Mag.* i. 322? I. floribunda, *Wight in Madr. Journ.* v. 7. I. bifida, *Thunb. Prodr. Pl. Cap.* 41. I. latifolia, *Moon Cat.* 18.

Mountains of Malabar; forests of the Sivagherry hills, alt. 4000 ft., *Wight;* Ceylon, abundant to 3000 ft., *Thwaites*, &c.

Stem 6–18 in., branched above. *Leaves* 2–5 in., membranous; petiole with stalked glands or naked. Pedicels solitary or several. *Flowers* rose-purple, ¾–1½ in. diam.; wings very variable; spur 1½ in., very slender, sometimes 2-fid to the middle. *Capsule* ½ in., ellipsoid, acuminate, quite glabrous. *Seeds* numerous, opaque, tuberculate with pale papillæ.—So similar in most characters to *I. latifolia*, that it is difficult to separate these species in the Herbaria. *I. flaccida* is, however, a smaller plant, more slender, with never opposite leaves, and has globose pubescent seeds, very different from those of *I. latifolia.* I have brought the alternate-leaved plants (*I. latifolia*, Bot. Mag. t. 5625, *I. bipartita*, Arn., *I. floribunda*, Wight, and *I. bifida*, Thunb.) to this, from *I. latifolia*, under which I had placed them before, because of their alternate leaves, though some or all may be alternate-leaved specimens of *I. latifolia.* The specimen of what I suppose to be this plant in the Linnean Herbarium has no name or habitat, and Thunberg has founded his *I. bifida* on it, because of its abnormally bifid spur, supposing it to have been a native of the Cape, where there is nothing at all like it.

51. **I. violæflora,** *H. f.*; very slender, erect, glabrous, simple or sparingly branched, leaves petioled very membranous elliptic-lanceolate

acuminate crenate-serrulate, pedicels axillary solitary or few slender, sepals minute, standard broadly obcordate, wings 2-lobed spreading, lobes obovate lateral rounded terminal retuse or 2-lobed, lip boat-shaped, spur very long straight and slender, capsule puberulous. I. flaccida, var. β, *H. f. & T. in Journ. Linn. Soc.* iv. 134.

TENASSERIM, at Moulmein, *Lobb.*

Very similar to *I. flaccida*, but the lobes of the wings are longer and narrower, the standard is obcordate and not spurred behind, and the capsule is smaller and puberulous.

52. **I. pulcherrima,** *Dalz. in Hook. Lond. Journ. Bot.* ii. 37; stout, succulent, erect, glabrous, leaves petioled ovate-lanceolate acuminate, pedicels 2–3 erect, sepals 2-fid minute, standard orbicular notched or spurred at the back, wings very broad 2-fid, lip boat-shaped or conoid, spur long stout curved, capsule glabrous, seeds large obovate rugose. *Hook. Bot. Mag.* t. 4615; *H. f. & T. in Journ. Linn. Soc.* iv. 134; *Dalz. & Gibs. Bomb. Flor.* 44.

Warree jungle in the SOUTHERN CONCAN, *Dalzell.*

Stem 1½–2 ft., simple or branched. *Leaves* 3–5 in., flaccid, ciliate towards the base, glabrous or with a few scattered hairs above; petiole 1–3 in., naked or with stipitate glands. *Pedicels* 2–3 in., slender, spreading. *Flowers* 1½–2 in. diam., rose- or violet-purple; wings spreading, flat, variable in shape; lip small; spur 2 in., rather stout, incurved. *Capsule* ½ in., very turgid. *Seeds* 2–8, subcompressed, testa very thick.—A very fine species, allied to *I. flaccida* in the flowers, but the seeds are wholly different.

53. **I. Henslowiana,** *Arn. in Hook. Comp. Bot. Mag.* i. 322; perennial?, stem very stout almost shrubby nodose scarred, leaves petioled ovate or lanceolate serrate acuminate hirsute, pedicels subsolitary erect, sepals large broad, standard orbicular or obovate, wings broad flat 2-partite, segments 2-lobed, lip small, spur very long incurved slender, capsule glabrous or pilose. *Thwaites Enum.* 65; *H. f. & T. in Journ. Linn. Soc.* iv. 135. I. albida, *Wight in Madr. Journ.* v. 7, t. 1; *Ic.* t. 743.

Mountains of MALABAR, clefts of rocks near Courtallum, alt. 2–7000 ft., *Wight*, &c. CEYLON, in the Central Province, alt. 4–6000 ft., on rocks.

Stem 8–16 in., as thick as the thumb, woody, sometimes so closely covered with scars as to be nodose, simple or branched. *Leaves* 3–5 in., crowded at the ends of the thick branches, serratures fine or coarse, both surfaces usually hirsute, sometimes glabrate; petiole ½–3 in., naked or glandular. *Pedicels* 2–5 in., stout, glabrous or pubescent. *Flowers* 1–2 in. diam., white or pale pink; sepals remarkably large, broadly ovate, acuminate; standard winged at the back (in Wight's figure); wings with very broad, flat, semi-obovate lobes; spur stout or slender, 1–1½ in. *Capsule* ¾–1 in., rather slender. *Seeds* not ripe.—The habit and large sepals and capsule are excellent characters of this plant.

A v.—LATERIFLORÆ.

54. **I. bella,** *H. f. & T. in Journ. Linn. Soc.* iv. 138; diffuse, stem short densely pubescent creeping below, leaves broadly ovate or orbicular crenate, petiole slender, peduncle pubescent 1–2-flowered bracteate in the middle, flowers large yellow, sepals large ovate, standard orbicular-obovate gibbous or bluntly spurred at the back, terminal lobe of wing elongate obovate, lip conical saccate narrowed into a long incurved spur.

KHASIA MTS., in marshes at the Kala Pane, alt. 5000 ft., *Griffith*, &c.

A small species, 6–10 in., growing in loose tufts; stem rather stout, rooting much at the base, glandular and almost tomentose with crisped hairs. *Leaves* 1–3 in., sometimes lanceolate, obtuse acute or acuminate, many-nerved, often pubescent above; petiole ¼–¾ in., pubescent, rarely glandular. *Peduncle* stout, usually from a subterminal axil, curved, pubescent, most often 1-flowered, with bracts in the middle; pedicel short. *Flower* 1 in. long without the spur, orange- or golden-yellow, beautifully streaked with purple. *Capsule* ½ in., ellipsoid, acute at both ends, turgid, pubescent. *Seeds* subglobose, papulose, puberulous, testa thick opaque.—A very distinct and beautiful little species.

VAR. *major;* more robust, leaves 3–4 in., flowers 1¾ in. red quite glabrous.—Khasia, alt. 5–6000 ft.

55. **I. latiflora,** *Hook. f. & Thoms. in Journ. Linn. Soc.* iv. 139; short, herbaceous, pubescent, leaves petioled elliptic-lanceolate caudate-acuminate crenate, peduncle erect stout 2–3-flowered, bracts ovate acuminate, flowers large, sepals broad, standard orbicular winged at the back, terminal lobe of wings large semi-ovate acute, lip boat-shaped, spur very long slender incurved.

Subtropical forests of the KHASIA MTS., alt. 3–4000 ft.; ? SIKKIM HIMALAYA, alt. 2–4000 ft. (specimens imperfect); BHOTAN, at Duphla, *Booth.*

Stem a foot high, branched or not, sometimes as thick as the little finger, remotely scarred. *Leaves* 3–7 in., sometimes narrowly lanceolate, glabrous except the nerves beneath, often ciliate towards the base, as is the puberulous petiole. *Peduncle* solitary, stout, erect, ¾–1 in.; bracts variable in position; pedicels stout. *Flowers* 1–2 in. diam., pale rose or violet; sepals acute; lateral lobe of wings obovate, retuse, smaller than the usually acute terminal one, which is sometimes 1 in. long; standard retuse; spur 1–2½ in., acute. *Capsule* immature, probably like that of *I. pulchra.*

56. **I. pulchra,** *H. f. & T. in Journ. Linn. Soc.* iv. 139; glabrous, stem short stout simple, leaves petioled elliptic-lanceolate acuminate serrate, peduncles stout erect 1–2-flowered, bracts lanceolate, flowers large, sepals broad, standard winged at the back, wings broad, lip funnel-shaped narrowed into the stout hooked spur.

Shaded woods in the subtropical and temperate regions of EASTERN NIPAL and the KHASIA MTS., alt. 4–5000 ft.

Stem 4–10 in., erect, nodose at the scars, rarely divided. *Leaves* 2–4 in., glabrous on both surfaces, rather coriaceous, not or rarely ciliate; petiole stout, naked. *Peduncles* 1–2 in, few, stout, erect; pedicels often as stout and as long. *Flowers* 2 in. long from the tip of the spur to that of the standard, pale rose-coloured or straw-coloured, streaked with red; sepals ½ in., green, acute; terminal lobe of wing semi-ovate obtuse; lip very large; spur sometimes spiral. *Capsule* ½–⅝ in., erect, narrowly ellipsoid-oblong, glabrous, subacute. *Seeds* many, immature, pubescent?

57. **I. fruticosa,** *DC. Prodr.* i. 687; shrubby, perennial, leaves elliptic acuminate many-nerved pubescent on both surfaces, petiole stout long, peduncles numerous 3–5-flowered, bracts linear, pedicels very long slender, flowers large, sepals broad, standard orbicular 2-lobed, wings lobed spreading, lip trumpet-shaped, spur very stout long curved. *W. & A. Prodr.* 137; *Wight Ic.* t. 966; *Wall. Cat.* 4762; *H. f. & T. in Journ. Linn. Soc.* iv. 140.

Mountains of MALABAR and TRAVANCOR, common at 4–6000 ft.

An erect much branched shrub, 8 ft. high; branches glabrous, nodose at the scars. *Leaves* 3–5 in., sometimes almost silky beneath, ciliate and glandular towards the base, nerves stout; petiole 2–3 in., often villous, naked or glandular. *Peduncles* 1–2 in.; pedicels often much longer and exceeding the leaves. *Flowers* 1½ in. broad; sepals acuminate; standard neither winged nor spurred; wing-lobes flat, subequal, divaricating, oblong; spur 1–1½ in. *Capsule* erect, 1 in., ellipsoid, narrowed at both ends, beaked. *Seeds* many, unripe, large, opaque, obovoid; testa thick, pitted.

A VI.—EPIPHYTICÆ.

58. **I. Jerdoniæ,** *Wight Ic.* t. 1602; epiphytic, glabrous, stem tumid short stout prostrate, leaves few petioled elliptic acute serrate, peduncles short, pedicels 1–3 very long, bracts setaceous, sepals long lanceolate, standard small hooded, wings small 2-lobed, spur very large saccate ventricose wrinkled, spur short horn-like or 0. *Hook. Bot. Mag.* t. 4739; *H. f. & T. in Journ. Linn. Soc.* iv. 141.

Mountains of MALABAR, on trees at Sisparah, the Brahmagherrie and Palghat hills, alt. 3-5000 ft., *Wight*, &c.

Stem 3–6 in., green or purple-brown, often as thick as the finger, rooting. *Leaves* 2–3 in., deep green, with glandular cilia at the base and on the top of the stout petiole, nerves few. *Peduncles* 1–3 in, green, stout; pedicels sometimes 4 in., red. *Flowers* 1½–2 in. measured along the lip; sepals acuminate, green; standard yellow, orbicular, apiculate, narrowly winged at the back; wings yellow, almost included in the lip, lobes rounded overlapping; lip bright red, laterally compressed.—In flower closely allied to *I. Walkeri.* I have seen no specimen of Beddome's *I. parasitica;* his character of it accords with that of *I. Jerdoniæ* in all but the green colour of the standard and sepals, and the moniliform stem. I shall therefore provisionally add it to this as a variety.

VAR.; stem moniliform, standard with a foliaceous crest and wings green.—I. parasitica, *Bedd. in Madr. Jour.* iv. t. 7, f. 2; *Ic. Pl. Ind. Or.* 28, t. 140.—Anamallay hills, alt. 6-7000 ft., *Beddome.*

59. **I. auriculata,** *Wight in Madr. Journ.* v. 8, t. 3; epiphytic, glabrous, stem short prostrate internodes very tumid, leaves petioled elliptic acute, peduncle short, pedicels 1–3 erect very long, bracts ovate, sepals very large obliquely oblong pendulous red, standard small hooded, wings very small 2-lobed, lip very large saccate wrinkled, spur short thick.

Mountains of MALABAR and TRAVANCOR, alt. 5000 ft., on branches of trees, *Wight*, &c.

A smaller plant than *I. Jerdoniæ*, with the internodes much swollen, sometimes as large as nuts, the stem appearing annulate in dried specimens. *Leaves* 1–2 in., obscurely crenulate, with but few glandular setæ at the base. *Pedicels* 1–1½ in. *Flowers* 1 in. measured along the lip; sepals very remarkable, pendulous, acute, much exceeding the wings, and sometimes as long as the lip, scarlet; standard dark green; wings dark purple, the segments cochleate and overlapping; lip scarlet, laterally compressed; spur very variable. *Capsule* unknown.—The sepals of this species are wholly different from any other in the genus, and hang down like a spaniel's ears.

60. **I. viridiflora,** *Wight in Madr. Journ.* v. 9; erect, glabrous, epiphytic, stem short extremely thick, branches few short nodose, leaves petioled elliptic acute crenate-serrate, peduncles short, pedicels 1–2 slender, sepals linear, standard orbicular 2-lobed back strongly keeled, lip saccate narrowed into a stout involute spur. *Bedd. Ic. Pl Ind. Or.* 29, t. 141.

Mountains of MALABAR; forming masses on the trunks of trees at the Sivagherry ghat, alt. 5000 ft., *Wight.*

Stem often 1 in. diam., fleshy. *Leaves* 1½–2 in., sometimes obovate or lanceolate, with very few glandular cilia at the base, rather fleshy, crenatures large; petiole stout. *Peduncle* ¼–½ in., usually 2-flowered; bracts subulate. *Flowers* 1 in. measured along the lip, wholly green; sepals reflexed or deflexed, acuminate; standard small, deeply hooded; wings fleshy, 2-lobed, lateral lobes hid under the standard, terminal oblong rounded; lip wrinkled, laterally compressed. *Capsule* glabrous.

A VII.—UMBELLATÆ AND SUBCAPITATÆ. (See *I. Goughii*, *trilobata*, and others in A III., *I. Tangachæ* and others in A VIII.)

* *Spur very slender, as long as or exceeding the flower.*

61. **I. fimbriata,** *Hook. Exot. Flor.* ii. t. 146; glabrous, stem erect subsimple, leaves opposite and alternate long-petioled ovate-lanceolate acuminate subserrulate, peduncle terminal long erect bearing at the top a subcapitate crowded raceme clothed with recurved ciliate bracts. I. bracteata, *Coleb. in Roxb. Fl. Ind. ed. Carey*, ii. 459; *Wall. Cat.* 4760; *H. f. & T. in Journ. Linn. Soc.* iv. 142.

Marshes in the KHASIA MTS., alt. 4–6000 ft., abundant.

Stem 1–2 ft., simple or branched, succulent. *Leaves* 2–5 in., opposite alternate and whorled sometimes on the same specimen, flaccid, ciliate or not at the base; petiole ¼–2 in.; stipules 0. *Peduncle* 2–6 in., strict, absolutely terminal in all the specimens, with sometimes an axillary one, naked; raceme ½–2 in., oblong or globose, very dense and covered with crinite-green slender recurved bracts, which are ⅙–½ in. long, clothed with long pink hairs and conceal the bases of the capillary pedicels. *Flowers* rose-purple, ¾ in. diam.; sepals small, lanceolate; standard small, ovate, with a recurved point; lateral wing-lobes small, rounded, terminal semi-ovate large broad clawed; lip boat-shaped; spur ¾ in., very long, slender, incurved. *Capsule* ⅓ in., ellipsoid, acute at both ends, turgid, glabrous. *Seeds* few, obovate, compressed, very hairy.—The Flora Exotica name having a year's priority over Colebrooke's, I am compelled to adopt it.

62. **I. janthina,** *Thwaites Enum.* 68; small, glabrous, stem simple 1–4-leaved, leaves opposite broad-elliptic or orbicular acuminate subserrate, peduncle terminal erect, flowers umbelled, bracts oblong, sepals broadly cordate, standard hooded, wings 2-lobed, lip saccate narrowed into the involute spur. *H. f. & T. in Journ. Linn. Soc.* iv. 142.

CEYLON; Hinidoon and Pasdoon Corles, at no great elevation, *Thwaites*.

Whole plant, 4–10 in.; stem sometimes very thick and succulent. *Leaves* 2–5 in., base rounded or subacute, not ciliate, sometimes oblique, very membranous; petiole ½–2 in.; stipules 0. *Peduncle* erect, 3–5 in., very slender; umbel terminal, 3–5-flowered, with sometimes a small lateral one; pedicels ½–1 in.; bracts broad, green, obtuse. *Flowers* ½–¾ in diam., violet; standard not winged, very concave; lateral lobe of wings rounded, obtuse, terminal acute. *Capsule* ⅓ in., ellipsoid, subacute, glabrous, many-seeded.—A very curious species, quite unlike any other, but allied to the preceding and following.

63. **I. umbellata,** *Heyne in Roxb. Fl. Ind. ed. Carey*, ii. 464; small, glabrous, stem simple stout leafy at the top, leaves crowded petioled broad-ovate or elliptic obtuse or acute crenate, peduncles subterminal erect 1–∞-flowered, sepals broad-ovate, standard orbicular, wings spreading lobes obtuse, lip small boat-shaped, spur long slender incurved. *Wall. Cat.* 4759; *W. & A. Prodr.* 137; *Wight in Madr. Journ.* v. 9, t. 4; *Ic.* t. 745; *H. f. & T. in Journ. Linn. Soc.* iv. 143.

Mountains of MALABAR, in Tinnevelly near Courtallum only, *Wight*.

Stem 4–8 in., very rarely branched, naked below. *Leaves* 1–2 in., sometimes orbicular, membranous, crenatures ciliate, base ciliate or not; petiole very variable, ¼–1½ in. *Peduncle* and *pedicels* stout; bracts small, green. *Flowers* ¾ in. diam.; standard not spurred; wings with subequal lobes; spur 1 in., graceful. *Capsule* ⅓ in., ellipsoid, turgid, glabrous. *Seeds* echinate (Wight).—Wight describes the root as tuberous, which is I think an error; it is fibrous and annual in his specimens.

64. **I. subcordata,** *Arn. in Hook. Comp. Bot. Mag.* i. 323; glabrous, stem prostrate and rooting at the base stout, leaves long-petioled ovate or

lanceolate acute or acuminate crenate base rounded or cordate, peduncles short 4–8-flowered, flowers umbelled or shortly racemed, sepals large ovate, standard orbicular not spurred behind, terminal lobe of wings very large and broad, lip small, spur long slender incurved. *Thwaites Enum.* 67; *H. f. & T. in Journ. Linn. Soc.* iv. 144.

Central province of CEYLON; alt. 3–6000 ft., *Walker*, &c.

Stem 1–2 ft., stout, sometimes much diffusely branched, smooth or scarred. *Leaves* very variable, 1–3 in.; crenatures large, ciliate or not; petioles ½–2 in., eglandular. *Peduncles* 2–4 in., axillary and subterminal; bracts ¼ in., ovate-lanceolate, acute. *Flowers* ½–¾ in. diam., white with red sepals and standard; spur ½–1 in., slender, incurved. *Capsule* ⅓ in., ellipsoid, beaked, glabrous. *Seeds* subglobose, hairy.

65. **I. viscida,** *Wight in Madr. Journ.* v. 12; *Ic.* t. 746; tall, slender, stem rigid angled rooting below hairy above, leaves petioled elliptic-lanceolate serrate firm, peduncles axillary very long viscid 3–∞-flowered, flowers umbelled or in short racemes, pedicels viscid, sepals suborbicular equalling the small standard, terminal lobe of wings large suborbicular, lip small boat-shaped, spur long strong incurved. *H. f. & T. in Journ. Linn. Soc.* iv. 144.

Pulney Mts. in the SOUTHERN CARNATIC, alt. 5500 ft., in beds of rivers, *Wight.*

Stem 2–3 ft., simple or sparingly branched, leafy all the way up, very rigid for the genus. *Leaves* 2–3 in., pubescent beneath on the midrib and numerous strong nerves, not ciliate, teeth glandular; petiole ½–1½ in. *Peduncles* 2–4 in., rigid, erect, terete; bracts ovate-lanceolate; pedicels short, often hairy. *Flowers* ⅔ in. diam., pink; sepals acuminate, almost as large as the orbicular acuminate standard; wings with spreading lobes, lateral short falcate, terminal twice as large hatchet-shaped, tip rounded; spur stout towards the base, slender on to the tip. *Capsule* ⅓ in., ellipsoid, beaked, ventricose, glabrous. *Seeds* numerous, globose, hairy.—Pedicels more or less hairy and viscid.

66. **I. cordata,** *Wight in Madr. Journ.* v. 10; glabrous, flaccid, stem prostrate and rooting below, leaves long-petioled ovate-cordate acuminate obscurely crenate, peduncle subterminal and axillary 3–4-flowered, flowers umbelled, pedicels glabrous, sepals large ovate acuminate, standard cuneate emarginate, lateral lobes of wings small incurved, terminal large broad spreading, lip boat-shaped, spur long slender incurved.

Sivagherry Ghats, on the MALABAR MOUNTAINS, *Wight;* Anamallay Mts., alt. 3–5000 ft.; TRAVANCOR, *Beddome.*

Stem 6–12 in., apparently succulent. *Leaves* 2–3 in., very membranous, crenatures with minute cilia, base ciliate or not, nerves slender, with scattered hairs on both surfaces; petiole 1–3 in. *Peduncles* 2–4 in.; bracts broadly ovate, ⅓ in., green; pedicels short. *Flowers* 1 in. diam., lilac with a purple centre; sepals almost equalling the standard; lateral lobes of wings fleshy, forming a vault over the stamens; terminal almost orbicular; spur ¾ in. *Capsule* ⅓ in., ellipsoid, beaked, glabrous. *Seeds* unripe.

67. **I. acuminata,** *Benth. in Wall. Cat.* 4754; shrubby, glabrous, stem simple stout, leaves crowded upwards petioled lanceolate acuminate crenate, peduncles axillary stout, flowers umbelled or racemed, bracts broad, sepals large ovate-cordate, standard orbicular, wings 2-partite, lip boat-shaped narrowed into the slender incurved spur. *H. f. & T. in Journ. Linn. Soc.* iv. 145.

Wet rocks in the KHASIA MTS., alt. 4–5000 ft.

Root perennial? *Stem* 6–14 in., naked below, almost invariably simple. *Leaves* 3–5 in., often caudate-acuminate, rather thick, crenatures minutely setigerous, not ciliate at the base; petiole ½–1 in., naked. *Peduncles* 1–1½ in.; bracts ⅙–¼ in., obtuse or acute, concave, green; pedicels ½–1 in., erect. *Flowers* about 1 in. diam., pale red;

sepals broad, very oblique, acuminate; standard not winged or spurred; lateral wing-lobes reniform, incumbent on the much larger triangular terminal one, lower margin of wing with an inflexed auricle; lip almost conical. *Capsule* $\frac{1}{3}$ in., short, erect, ellipsoid, subacute. *Seeds* many, minute, woolly.

68. **I. Hookeriana,** *Arn. in Hook. Comp. Bot. Mag.* i. 324; shrubby, glabrous, stem and branches robust, leaves elliptic acute or acuminate crenate-serrate thick, petiole long with 2 large glands, flowers 4–6 subumbelled long pedicelled, sepals small lanceolate, standard transversely oblong spurred at the back, wing-lobes large broad rounded, lip small continuous with the long curved stout spur. *Hook. Bot. Mag.* t. 4704; *Thwaites Enum.* 66; *H. f. & T. in Journ. Linn. Soc.* iv. 145. I. biglandulosa, *Moon Cat.* 18.

Central Province of CEYLON, alt. 3–5000 ft.

A shrub, 4–5 ft., with very stout stem and often scarred branches as thick as the finger. *Leaves* 4–8 in., crenatures with a bristle; petiole 1–4 in., stout, with 2 large opposite glands above the middle (usually at the top). *Peduncle* 3–4 in., erect, very robust; bracts small, caducous; pedicels very slender. *Flowers* 2 in. diam., white or with the wings streaked with blood-red; standard very large; wings spreading, lateral lobes oblong, terminal much larger, notched towards the tip; spur and lip $1\frac{1}{2}$-$2\frac{1}{2}$ in. *Capsule* $\frac{1}{2}$–$\frac{2}{3}$ in., ellipsoid, beaked, glabrous, obtuse. *Seeds* many, young pubescent.—This, though closely allied to *I. grandis*, seems to differ in the much smaller sepals, as well as in the shape of the wings, lip, and spur.

69. **I. grandis,** *Heyne in Roxb. Fl. Ind. ed. Carey,* ii. 464; shrubby, glabrous, stem and branches robust, leaves elliptic acute or acuminate crenate-serrate thick, flowers 4-6 subumbelled long-pedicelled, sepals large broad-ovate, standard orbicular, lateral wing-lobes obovate terminal cuneate notched, lip saccate obtuse or prolonged into a very stout conoidal straight spur. *Wight in Madr. Jour.* v. 10, t. 5; *W. & A. Prodr.* 137; *Arn. in Hook. Comp. Bot. Mag.* i. 324; *Bedd. Ic. Pl. Ind. Or.* 31, t. 153; *H. f. & T. in Journ. Linn. Soc.* iv. 145.

Mountains of MALABAR and TINNEVELLY, alt. 1–4000 ft., *Wight*, &c.

Shrubby, 8 ft. high, habit, foliage, and inflorescence of *I. biglandulosa*, and with the same coloured flower, but the sepals are three times as large, the standard more orbicular, the wing-lobes much narrower, and the lip ends in a sac or very stout conoidal straight spur.

** *Spur shorter than the flower or* 0. (*See* I. grandis *and* biglandulosa *in* *).

70. **I. campanulata,** *Wight in Madr. Jour.* v. 11, t. 7; *Ic.* t. 744; herbaceous, robust, glabrous, sparingly branched, leaves long-petioled elliptic- or ovate-lanceolate crenate glaucous beneath, peduncle stout, flowers 3 umbelled, bracts very large deciduous, sepals very large and broad ovate, standard orbicular keeled at the back, wing-lobes small incurved, lip smooth boat-shaped, spur very short. *H. f. & T. in Journ. Linn. Soc.* iv. 145.

Mountains of the SOUTHERN CARNATIC, alt. 5–7000 ft., in moist woods, *Wight*.

Stem 4–5 ft., as thick as the finger. *Leaves* 3–6 in., membranous, crenatures ciliate, base usually 2-glandular; petiole 1–2 in., eglandular. *Peduncle* 2–3 in., very stout, erect; bracts $\frac{1}{2}$ in., ovate-lanceolate, subfoliaceous; pedicels short. *Flowers* campanulate, white and yellow speckled with purple; sepals perhaps the largest of the genus, acuminate; standard apiculate; wings concave and pointing forwards, lateral lobe small, obovate, overlapping the larger hatchet-shaped protruded terminal one. *Capsule* $\frac{2}{3}$ in., ellipsoid, pointed at both ends, glabrous. *Seeds* globose, echinulate.

71. **I. leucantha,** *Thwaites Enum.* 67; glabrous, stem erect simple rarely forked, leaves in 1 whorl or fascicled rarely opposite shortly petioled lanceolate acuminate serrulate, peduncles several long erect, flowers in a short terminal raceme, bracts ovate-lanceolate, sepals ovate-oblong acute, standard hooded, lateral lobe of wings small lanceolate, terminal large 3-lobed, lip boat-shaped, spur short straight.

CEYLON; at Hinidoon and Kittool Galle, *Thwaites.*

Stem 5–10 in., naked below, succulent. *Leaves* 6–10 in the fascicle, of unequal sizes, 3–6 in., serratures acute, base often ciliate; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* many, longer or shorter than the leaves, many-flowered; pedicels capillary, spreading, $\frac{1}{4}$–1 in.; bracts green, concave. *Flowers* white, $\frac{1}{2}$ in. diam.; standard not winged; wings with the lobes rounded; spur $\frac{1}{6}$ in. *Capsules* $\frac{1}{3}$ in., unripe, erect, ellipsoid, glabrous, beaked.

72. **I. linearis,** *Arn. in Hook. Comp. Bot. Mag.* i. 323; stem short stout simple, leaves crowded upwards subsessile linear-lanceolate acute subserrate, peduncles solitary or 2 stout erect, flowers very shortly umbelled, bracts ovate, sepals short ovate, standard short spurred at the back, terminal lobe of wings large obovate clawed, lip concave, spur very short. *H. f. & T. in Journ. Linn. Soc.* iv. 143.

Adam's Peak, CEYLON, alt. 4–6000 ft., *Walker,* &c.

Erect, glabrous; stem stout, scarred. *Leaves* many, 1–3 in., all crowded at the top of the stem, rather thick, base not ciliate. *Peduncle* 1–2 in., very stout; bracts $\frac{1}{5}$ in., green, spreading, acuminate, concave; pedicels slender, spreading. *Flowers* $\frac{1}{2}$ in. diam.; wings large; spur a mere point. *Capsule* $\frac{1}{4}$ in., ellipsoid, very turgid, acuminate, glabrous. *Seeds* many, very small, pubescent.

VAR. *petiolata;* leaves rather broadly petioled with scattered short hairs on the upper surface.

73. **I. appendiculata,** *Arn. in Hook. Comp. Bot. Mag.* i. 323; small, glabrous or pubescent, stem slender, leaves solitary few or many petioled ovate elliptic or lanceolate acute serrulate, peduncles long solitary or few, flowers umbelled or very shortly racemed, bracts broad-ovate or lanceolate, sepals ovate or oblong, standard hooded, lateral lobe of wings lanceolate caudate, terminal large clawed $\frac{1}{2}$-cordate, lip boat-shaped, spur very short. *Thwaites Enum.* 67.

Southern and Central parts of CEYLON, alt. 2–5000 ft.

Very variable, both in habit and foliage. *Stem* simple, rarely branched, naked below, usually leafy above, with the leaves 1–1$\frac{1}{2}$ in. broad, long-petioled and almost glabrous above; other specimens have 4 similar but pubescent leaves in a whorl, others 1, 2, 3, or a few lanceolate acuminate leaves, 4 in. long. *Leaves* membranous, usually ciliate towards the base. *Peduncle* often solitary, subterminal and longer than the leaves, with an umbel or very short raceme of 4–8 flowers; bracts $\frac{1}{6}$ in., concave, acuminate, green; pedicels slender, spreading. *Flowers* about $\frac{3}{4}$ in. long, white or pale rose-colour; standard streaked transversely with red.—Thwaites describes the lateral lobes of wings as small lanceolate long-caudate, the terminal as larger $\frac{1}{2}$-cordate and acuminate; the spur is sometimes reduced to a mere point. *Capsule* $\frac{1}{3}$ in., ellipsoid, turgid, beaked, many-seeded. *Seeds* immature, oblong, hairy?

74. **I. travancorica,** *Bedd. Ic. Pl. Ind. Or.* p. 29, t. 142; small, stem simple stout leafy at the top, leaves crowded small petioled elliptic subacute crenate, peduncles 1-3 subterminal erect 2–4-flowered, bracts lanceolate, flowers umbelled small, sepals obliquely ovate, standard small concave, terminal lobe of wings large sessile, lip boat-shaped, spur short obtuse or 0.

Mountains of Travancor; Myhendra and Aghasteer, alt. 4–5000 ft., *Beddome.*
Stem strict, 6–8 in., naked below. *Leaves* ½ in., rather thick, ciliated in the crenatures; petiole slender, often as long as the blade. *Peduncles* 1–2 in.; bracts green, subulate-lanceolate, spreading. *Flowers* ½ in. diam., white streaked with red, very membranous; sepals oblique, acuminate; lateral lobe of wings small. *Capsule* unknown.

75. **I. uncinata,** *Wight in Madr. Journ.* v. 11, t. 6; *Ic.* t. 747; slender, elect, glabrous, leaves long-petioled ovate or ovate-cordate crenate, peduncles slender 4–8-fld., flowers small subumbelled or shortly racemed, sepals very large obliquely ovate, standard small elliptic, wings divaricating, terminal lobe obovate falcate, lip subcampanulate, spur short, inflated hooked. *H. f. & T. in Journ. Linn. Soc.* iv. 144.

Mountains of the Southern Carnatic, in dense shaded jungles near Courtallum, alt. 2–3000 ft., *Wight.*
Stem 6–10 in., sparingly branched, leafy. *Leaves* 2–4 in., very membranous, ciliate often at the base, crenatures large, minutely ciliate; petiole 1–3 in., rather slender. *Peduncle* shorter than the leaves; bracts small, rather persistent; pedicels ½–1 in. *Flowers* ¾ in. diam.; sepals very large for the size of the plant; standard pointed; lateral wing-lobes oblong, pointed forward, terminal protruded, rather hatchet-shaped; lip shortly campanulate; spur constricted at the insertion, inflated below it, with a more slender upcurved tip. *Capsule* ⅓ in., ellipsoid, beaked, turgid, glabrous. *Seeds* few, unripe, apparently orbicular and glabrous.

76. **I. elegans,** *Bedd. Ic. Pl. Ind. Or.* p. 29, t. 145; stout, glabrous, stem erect stout simple or branched, leaves long-petioled ovate or ovate-cordate acuminate crenate, peduncles slender axillary and terminal erect, flowers 3–5 umbelled or shortly racemed, bracts large ovate-lanceolate, sepals ovate, standard small orbicular-ovate, lateral wing-lobes small rounded arched over the stamens, terminal very large obliquely ovate acute, lip very small boat-shaped, spur 0.

Anamallay hills, in Travancor, alt. 2500–5000 ft., common, *Beddome.*
Stem 6–12 in., simple or branched, often rooting at the joints. *Leaves* 2–4 in., very membranous, crenatures minutely ciliate; petiole 1–3 in. *Peduncles* 1–3 in.; bracts ¼ in., usually recurved, whorled; pedicels capillary, spreading. *Flowers* 1 in. across the wings, pale rose colour with a purple eye, those from the highest localities the largest; standard apiculate flat with a green dorsal ridge; terminal wing-lobe sessile, tip obtuse entire, inner margin obscurely retuse towards the tip. *Capsule* ⅓ in., ellipsoid, beaked, turgid in the middle, glabrous. *Seeds* hairy, subglobose.—In many respects near *I. cordata,* in which the side lobes of the wings are also incurved.

A viii.—Racemosæ.

* *Spur long and slender.*

77. **I. maculata,** *Wight in Madr. Journ.* v. 12; tall, slender, branched, leaves long-petioled elliptic-lanceolate acuminate serrate hairy above and beneath, peduncles and very long lax racemes much exceeding the leaves, pedicels horizontal, sepals large broad, standard small, lateral lobes of wings minute terminal very large, lip conoid, spur very long slender. *H. f. & T. in Journ. Linn. Soc.* iv. 149.

Mountain streams in Malabar; Sivaghery hills, alt. 4–7000 ft., *Wight.*
Stem 5–6 ft.; branches and petioles laxly hairy, or glabrate. *Leaves* 3–5 in., membranous, often 2-glandular at the base, serratures not tipped with a bristle; petiole 1–2 in., sometimes with 2 or more long stipitate glands. *Raceme* and stiff peduncle together 6–12 in., quite erect; bracts ovate, persistent; pedicels 1 in. *Flower* nearly 1 in. long; sepals and orbicular standard acuminate; terminal wing-lobe suborbicular, lateral hid under the standard; spur twice as long as the flower, curved up. *Capsule*

⅓ in., ellipsoid, beaked, glabrous. *Seeds* suborbicular, pustular, and shortly hairy.—The glands of the leaf-base and petiole are sometimes spirally involute.

78. **I. elongata,** *Arn. in Hook. Comp. Bot. Mag.* i. 324; tall, stout, glabrous, simple or branched, leaves stout-petioled elliptic acuminate serrate thick, peduncles far exceeding the leaves very stout, racemes lax, pedicels horizontal, sepals rather large ovate, standard small, lateral lobes of wings small, terminal large, lip small, spur long very slender. *Thwaites Enum.* 67; *H. f. & T. in Journ Linn. Soc.* iv. 150.

Adam's Peak in CEYLON, alt. 3–4000 ft.

Apparently about 3 ft. high; stem woody below, straight or flexuous and scarred above. *Leaves* 2–3 in.; serratures gland-tipped. *Peduncle* very lax; raceme 4–10 in., stout; bracts ovate, acuminate, persistent; pedicels 1–1½ in., horizontal, thickened upwards. *Flower* 1 in. long, red; sepals acuminate, the small dorsally spurred standard about equalling the lateral lobes of the wings; terminal lobe oblique; spur 1½ in., tip thickened. *Capsule* ⅓ in., ellipsoid, beaked, glabrous.

79. **I. cornigera,** *Arn. in Comp. Bot. Mag.* i. 323; quite glabrous, stem simple rather stout, leaves (rarely opposite) petioled elliptic-lanceolate acute or acuminate crenate, peduncles subterminal slender erect, racemes short lax, pedicels capillary, sepals small ovate, standard oblong acuminate, lateral wing-lobes minute, terminal subquadrate with a broad claw, spur long or short rather stout circinate at the tip. *Thwaites Enum.* 67; *H. f. & T. in Journ. Linn. Soc.* iv. 150.

Warmer parts of CEYLON, in damp woods.

Stem 6–24 in., stout or slender, usually the former, often naked below and very leafy above. *Leaves* very variable, 3–6 in., sometimes variegated with white along the midrib, rarely serrate, crenatures ciliate; petiole ¼–1 in. *Peduncles* erect, longer or shorter than the leaves; raceme 1–2 in.; bracts small, ovate, acute; pedicels 1 in., horizontal. *Flowers* 1 in. long, yellow, variegated with green or pale rose; standard concave, orbicular when spread out; terminal lobe of wings with concave sides and broad oblique notched apex; spur very variable, sometimes inflated below. *Capsule* ⅓ in., ellipsoid, turgid, beaked, glabrous. *Seeds* few, orbicular, compressed, shining.—The shining smooth compressed seeds ally this to *I. Kleinii*, &c.

80. **I. Arnottii,** *Thwaites Enum.* 67; quite glabrous, stem simple rather slender, leaves petioled elliptic-lanceolate acuminate crenulate sparsely hairy above, peduncles strict subterminal, flowers few and shortly racemed or subumbelled, sepals small cordate, standard small, lateral wing-lobes small, terminal large clawed semicircular, lip small, spur slender incurved.

Central Province of CEYLON, alt. 1–3000 ft., rare, *Thwaites.*

Very similar to *I. cornigera*, but more slender, racemes shorter or flowers sometimes umbelled, red-purple, tinged yellow in the centre, and with very differently shaped terminal wing lobes which are notched at the apex on one side.—The base of the stem in this and its allies seems to form a perennial tuber.

81. **I. phœnicea,** *Bedd. in Madr. Journ.* iii. 175; *Ic. Pl. Ind. Or.* p. 30, t. 148; suffruticose, erect, glabrous, leaves petioled lanceolate, narrowed at both ends serrate, peduncles axillary as long as the leaves racemose, bracts cordate, raceme few-flowered, sepals ovate, standard broad ovate, wings small, lateral lobe cordate overlapping the much larger oblong terminal one, lip with spur trumpet-shaped incurved.

Pulney hills in the SOUTHERN CARNATIC, alt. 6–7000 ft., *Beddome.*

Apparently a slender sparingly branched herb, quite glabrous. *Leaves* 3–4 in., membranous, serratures with rather long cilia; petiole ½–1 in., naked. *Peduncles* axillary, slender, erect; bracts ⅕ in., persistent; pedicels ½–1 in., slender. *Flowers* 4–14, 1 in. long, campanulate, brilliant scarlet, yellow in the centre; standard vaulted, dorsally winged; tip of spur swollen.—Major Beddome regards this as allied to *I. Walkeri*, of Ceylon.

82. **I. Tangachee,** *Bedd. Ic. Pl. Ind. Or.* p. 30, t. 147; glabrous, stem stout short subprocumbent, leaves obscurely whorled subsessile narrowly elliptic-lanceolate acuminate serrate, peduncles exceeding the leaves very stout erect, flowers subumbelled or racemed, pedicels erect, sepals oblong, standard short broad, lateral wing-lobes truncate terminal broadly cuneate, lip small boat-shaped, spur slender incurved.

Anamallay hills in TRAVANCOR, alt. 4000 ft. and upwards, in river-beds, *Beddome*; Bolemputty, *Wight*.

A short simple or forked herb, 6–10 in. *Stem* naked and rooting below. *Leaves* 2–3 in.; glabrous on both surfaces, thick, nerves few slender. *Peduncles* very stout, 1⅓–2½ in.; bracts ⅕ in., coriaceous; pedicels ½–1½ in., stout, thickened upwards. *Flowers* 4–8, 1–1¼ in., bright rose; spur stout, straight or hooked, terminal wing-lobe with a broadly truncate and erose apex; spur 1 in., straight or incurved. *Capsule* ⅓ in., gibbous, glabrous. *Seeds* many, very small.

83. **I. leptura,** *Hook. f.*; quite glabrous, branches slender, leaves long-petioled elliptic acuminate crenate membranous, peduncles axillary slender 2–3-fid, bracts deciduous, sepals broad ovate very oblique, standard small vaulted, lateral wing-lobes small rounded, terminal very large suborbicular, lip small saccate, spur long very slender incurved.

Anamallay hills, in MALABAR, alt. 4500–5500 ft., *Beddome*.

Leaves 4–6 in., very membranous, with or without gland-tipped bristles at the base, crenatures ciliate; petiole 1–3 in., slender. *Peduncles* shorter than the leaves; bracts ovate, small; pedicels ½–1 in. *Flowers* 1 in. across the broad flat wings; standard quite small, not winged or spurred dorsally; lateral wing-lobes very small, concave, overlapping the very large terminal ones which are quite entire; spur 1–1½ in., flexuous, turned to one side. *Capsule* ⅓ in., ellipsoid, beaked, turged in the middle, glabrous. *Seeds* many, orbicular, young pilose, probably large.—I have only fragments of this very distinct species, which is labelled *I. cordata*? by Major Beddome.

** *Spur short, or* 0. (See also *I. cornigera*).

84. **I. Wightiana,** *Bedd. Ic. Pl. Ind. Or.* p. 30, t. 146; suffruticose, erect, glabrous, leaves long-petioled elliptic-lanceolate acuminate serrate, petiole with many stipitate glands, peduncles slender shorter than the leaves, bracts ovate, racemes lax, pedicels capillary, sepals small, standard small orbicular ovate apiculate, lateral wing-lobes small spreading, terminal very large long oblong obtuse, lip funnel-shaped, spur short incurved.

Moist forests in the Anamallay hills, TRAVANCOR, alt. 3–4500 ft., *Beddome*.

Leaves 5–6 in., with a few scattered hairs above on the nerves, membranous, lineolate between the nerves; petiole 1½–2½ in., slender. *Peduncles* flowering almost throughout their length; bracts very small; pedicels spreading in fruit. *Flowers* 1–1¼ in. long, white mottled with pink; standard with a green dorsal ridge; upper wing-lobe oblong, pointing forwards, terminal narrow, obtuse; spur very short, hooked. *Capsule* ¼ in., trapezoid, glabrous. *Seeds* about 5, globose, hairy.

85. **I. Walkeri,** *Hook. Comp. Bot. Mag.* i. 324, t. 18; tall, erect, quite glabrous, leaves very long-petioled elliptic-lanceolate acuminate serrulate, peduncles stout erect, flowers 6–8, bracts broadly ovate, pedicels slender erect, sepals small ovate-cordate, wings small 2-partite, lip elongate serrate ventricose incurved laterally compressed, spur very short incurved. *Bot. Mag.* t. 5237.

Central Provinces of CEYLON, alt. 4–6000 ft.

Root tuberous, perennial. *Stem* 1–2 ft., stout, simple or branched. *Leaves* $1\frac{1}{2}$–4 in., thick, serratures ciliate, petiole $\frac{1}{4}$–1 in. *Peduncles* stout, erect; racemes 4–8-flowered; bracts small, persistent; pedicels slender, erect, spreading in fruit. *Flowers* $\frac{2}{3}$–1 in., scarlet, rarely yellow; sepals small, ovate; standard very small, hooded; wings very small, lateral lobes rounded, almost hidden under the standard; terminal lobes orbicular protruded, notched on the inner margin towards the rounded end; lip very large, walls undulate; spur slender, hooked, swollen at the tip. *Capsule* $\frac{1}{3}$ in., ellipsoid, gibbous, glabrous. *Seeds* unknown.

86. **I. tavoyana,** *Benth. in Wall. Cat.* 4773; short, quite glabrous, stem stout succulent, leaves petioled ovate acuminate subserrate base with long cilia, peduncles subterminal erect slender, flowers small in short racemes, bracts minute, pedicels spreading capillary, sepals narrow, standard small oblong concave spurred at the tip, terminal wing-lobes very long-clawed pendulous oblong?, lip boat-shaped with a gibbosity or short slender spur. *H. f. & T. in Journ. Linn. Soc.* iv. 146. I. lineata, *Turcz. in Bull. Soc. Nat. Mosc.* 1859, i. 271.

TENASSERIM at Moulmein, *Lobb.*

Annual. *Stem* 4–10 in., simple or branched. *Leaves* 2–3 in., very membranous, serratures ciliate, hairs at the base not glandular; petiole $\frac{1}{2}$–1 in. *Peduncles* 1–3 in., erect or spreading; raceme terminal, 8–14-flowered; bracts setaceous, persistent, pedicels $\frac{1}{2}$–1 in. *Flowers* $\frac{1}{2}$ in. long, white? with purple streaks on the lip, sepals variable in shape, usually linear; standard with a green spur at the tip; claw of wings $\frac{1}{3}$ in. long, very narrow, strap-shaped, blade shorter than the claw, obovate-cuneate, with a callous auricle at the base; lip large for the plant, very concave, acuminate; spur sometimes as long as the lip, and turned up along its base. *Capsule* $\frac{1}{4}$ in.; trapezoid, acutely beaked, glabrous. *Seeds* 2–3, oblong, compressed, opaque, glabrous.—An exceedingly curious species, the long slender claws of the wings are unique in the genus. The form of the wing itself, as described, I have not ascertained with sufficient confidence.

87. **I. racemulosa,** *Wall. Cat.* 7274; stem simple erect leafy, leaves long-petioled elliptic-ovate acute crenate-serrate, petiole eglandular, racemes flexuous axillary 6–8-flowered, bracts ovate, pedicels capillary, flowers $\frac{3}{4}$ in., sepals obliquely ovate, standard small orbicular, terminal lobe of wings very large $\frac{1}{2}$-orbicular violet, lip boat-shaped, spur incurved slender. *H. f. & T. in Journ. Linn. Soc.* iv. 138.

KHASIA MTS., in marshes, alt. 4–5000 ft., *Gomez*, &c.; BHOTAN, *Herb. Griffith.*

Stem 6–8 in., succulent, sometimes thick. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ in., membranous, exstipulate. *Racemes* 1–2 in., horizontal; pedicels scattered, spreading, $\frac{1}{2}$ in.; bracts $\frac{1}{10}$ in., coriaceous, persistent, glandular at the tip. *Flowers* $\frac{2}{3}$ in. across the wings, of a deep fine violet colour; standard not spurred at the back; lateral lobes of wings small; spur $\frac{1}{2}$–$\frac{3}{4}$ in., obtuse, curved into a semicircle. *Capsule* short, $\frac{1}{3}$ in., clavate, acute, glabrous. *Seeds* few, small.—A very beautiful plant, allied to none.

B. Capsule linear.

B I.—OPPOSITIFOLIA and VERTICILLATA. (See *I. tripetala* in B II.)

88. **I. Roylei,** *Walp. Rep.* i. 475; tall, robust, branches quite glabrous, leaves usually opposite and whorled lanceolate or ovate-lanceolate, sharply serrate, stipules of seta, peduncles subterminal, flowers many umbelled or racemed, standard 2-lobed, wings broad, lip saccate very obtuse, spur short, capsule clavate beaked cernuous. *H. f. & T. in Journ. Linn. Soc.* iv. 127. I. glandulifera, *Royle Ill.* 151, t. 28, f. 2; *Lindl. Bot. Reg.* 1840, t. 22; *Hook. Bot. Mag.* t. 4020.

Temperate Western Himalaya; common from NIPAL to MARRI, alt. 6–8000 ft.

A handsome often gigantic species, 4–10 ft., with the stem as thick as the thumb, fleshy. *Leaves* very variable as to disposition, size, breadth, petiole, and cutting of the margin, base rounded or acute; stipules of stout gland-tipped setæ. *Peduncles* 2–5 in., stout, straight, erect; bracts ovate-lanceolate, acuminate. *Flowers* usually pale red-purple, sometimes white; sepals $\frac{1}{6}$–$\frac{1}{3}$ in., green. *Capsule* $\frac{1}{2}$–$\frac{3}{4}$ in., clavate, or much narrowed towards the base, top abruptly beaked, glabrous, usually drooping, very turgid in the middle. *Seeds* large, broadly obovoid; testa opaque, spongy.—Very closely allied to *I. longicornu*, *sulcata*, and *Thomsoni*. Edgeworth considers that *I. moschata* differs specifically in its musky odour, habit, and more deeply serrated leaves.—Seeds eatable raw, tasting like nuts.

VAR. 1; leaves crenate-serrate, serratures glandular.

VAR. 2. *moschata;* leaves alternate and whorled, coarsely serrate, less glandular. I. moschata, *Edgew. in Trans. Linn. Soc.* xx. 38.

VAR. 3. *candida;* uppermost leaves opposite or whorled, flowers white spotted with crimson. I. candida, *Lindl. in Bot. Reg.* 1840, *Misc.* 85; 1841, t. 20.

VAR. 4. *macrochila;* upper leaves alternate, terminal lobes of the wings longer dimidiate-ovate falcate. I. macrochila, *Lindl. Bot. Reg.* 1840, t. 8.

89. **I. Thomsoni,** *Hook. f. in Journ. Linn. Soc.* iv. 128; tall, robust, branched, quite glabrous, leaves opposite below whorled or alternate above, petioled ovate acuminate coarsely serrate, stipules pulvinate, peduncles erect, flowers umbelled, sepals ovate-lanceolate, standard entire, wings 2-lobed, lip conical narrowed into the rather long spur, capsule narrowly clavate.

Inner ranges of the Temperate Himalaya, PITI and KUNAWUR, alt. 9–10,000 ft., *T. Thomson;* KUMAON and GARWHAL, alt. 12,000 ft., *Strach. & Wint.;* SIKKIM, alt. 12,000 ft., *J. D. H.*

Probably a small state of *I. Roylei* or *sulcata*, 2–12 in. high, with flowers only half the size, a conical or trumpet-shaped lip narrowed into the spur, and a narrower capsule $\frac{1}{2}$–1 in. long. It is only found in the interior and drier Himalayan ranges, and varies exceedingly in the size of all its parts. The flowers are pale and spotted. The stipules usually form a large glandular tubercle.

90. **I. sulcata,** *Wall. Cat.* 4764 *in part;* stem stout erect grooved quite glabrous, leaves usually opposite and whorled elliptic-ovate or lanceolate coarsely crenate-serrate, stipules pulvinate, flowers many umbelled or racemed, standard 2-lobed, wings broad, lip saccate obtuse, spur short inflexed, capsule elongate horizontal. *H. f. & T. in Journ. Linn. Soc.* iv. 129. I. gigantea, *Edgew. in Trans. Linn. Soc.* xx. 38.

Temperate Himalaya, alt. 7–12,000 ft., from MARRI to SIKKIM.

A gigantic annual herb, said to attain 15 ft. in height, but I never saw it more than 8 in Sikkim, with furrowed fistular stems, so like *I. Roylei* that I suspect it may prove to be a variety of that plant, differing in the more crenate leaves, stipules (a very variable character), and the longer narrow inclined capsules 1 in. long, which are but slightly clavate, and have similar large eatable seeds. It should also be compared with states of *I. longicornu*. The 4 lateral sepals are sometimes developed in Sikkim.

Var. *minor;* smaller, lip conical.—Kunawur, alt. 8000 ft., *T. Thomson.*

91. **I. amplexicaulis,** *Edgew. in Trans. Linn. Soc.* xx. 37; tall, branched, quite glabrous, leaves sessile lower opposite oblong-lanceolate upper alternate ovate-lanceolate amplexicaul, all crenate-serrate, stipules pulvinate or obsolete, flowers umbelled or racemed, standard orbicular 2-lobed, wings 2-lobed, lip saccate acute or obtuse, spur short inflexed, capsule slender horizontal. *H. f. & T. in Journ. Linn. Soc.* iv. 129.

Western Temperate Himalaya, alt. 6–12,000 ft.; KULU, *Edgeworth;* SIMLA, *Lady Dalhousie;* KUMAON, *Strach. & Wint.*

A very distinct species in foliage, and at once recognised by the alternate amplexicaul upper leaves, but the lower leaves, habit, flowers and fruit differ little from *I. sulcata* and *Thomsoni.* The stem is 4-angled, peduncles short, flowers fewer and smaller, and the capsule is hardly clavate, 1–1¼ in.

B II.—UNIFLORÆ. (See also *I. discolor*, *spirifer* and *serrata* under B III., which are sometimes 1-flowered).

92. **I. tripetala,** *Roxb. Fl. Ind. Ed. Carey*, ii. 453; tall, glabrous, rarely pubescent, branched, stout, leaves large membranous long petioled opposite alternate or whorled ovate- or elliptic-lanceolate acuminate crenulate, pedicels slender solitary or fascicled, flowers large, sepals subulate falcate, standard obovate spurred at the back, wings small, lip deeply saccate, spur short abrupt incurved. I. multiflora, *Wall. Cat.* 4742; *H. f. & T. in Journ. Linn. Soc.* iv. 126.

Tropical Himalaya, SIKKIM, alt. 2–5000 ft., *J. D. H.;* BHOTAN, Duphla Hills, *Booth;* ASSAM, SILHET, and KHASIA MTS., alt. 0–3000 ft.

Annual. *Stem* stout, succulent, 1½–2 ft., swollen at the nodes, simple or with opposite branches. *Leaves* 2–8 in., exclusive of the petiole, which is often 5 in., membranous, acuminate, glabrous or sparsely pubescent above, nerves very numerous, lower crenatures often with bristles. *Pedicels* ½–1 in., glabrous, bracteate at the base when fascicled on a short peduncle. *Flowers* red or purple, 1½ in. from the base of the lip to the tip of the standard, glabrous or pubescent; sepals very small for the size of the flower; standard galeate; wings with two suborbicular lobes; lip rounded at the base, suddenly narrowed into a spur. *Capsule* ½–¾ in., ellipsoid, quite glabrous. *Seeds* many, pyriform, testa rough opaque.—Specimens of this might be referred to sections B. I. and B. III., according as the leaves are opposite or alternate, and the pedicels solitary or collected on a peduncle.

93. **I. puberula,** *DC. Prodr.* i. 684; slender, erect, leafy, pubescent, leaves petioled elliptic-lanceolate crenate acuminate eglandular, pedicels subterminal bracteate slender 1-flowered, flowers pubescent violet, sepals broad, standard orbicular notched dorsally winged, terminal lobe of wings broadly semi-obovate, lip conoidal, spur long slender incurved, capsule slender. *Wall. Pl. As. Rar.* ii. 83, t. 193; *Cat.* 4767 A; *H. f. & T. in Journ. Linn. Soc.* iv. 141. I. mollis, *Wall. in Roxb. Fl. Ind. Ed. Carey*, ii. 461. I. hispidula, *Benth. in Wall. Cat.* 4740.

Temperate regions of the SIKKIM and NIPAL HIMALAYA, alt. 5–6000 ft.

Stem 2–3 ft., sparingly branched, pubescent above. *Leaves* 1–3 in., membranous, usually pubescent on both surfaces; petiole rather short; stipules 0. *Pedicels* 1–1½ in., pubescent, usually confined to the uppermost axils; bracts subulate, basal, or 0. *Flower* flat, 1¼–1½ in. from the standard to the wings; sepals broad ovate acuminate; standard almost as large as the two wings, and, like them, of a deep violet colour; wings of 2 sessile lobes, lateral smaller rounded; lip rather small; spur ½ in. *Capsule* 1 in., glabrous. *Seeds* immature.—In the Linnean Journal I confounded with this under variety β, a Khasia plant which I now find should be referred to *I. bella*, leaving this a single-flowered species. The Sikkim specimens are larger leaved and more glabrous than the Nipalese.

94. **I. arguta,** *H. f. & T. in Journ. Linn. Soc.* iv. 137; slender, erect, glabrous or sparsely pubescent, leaves ovate or lanceolate sharply serrate, petiole usually glandular, peduncle very short 1–2-flowered, bracts setaceous twisted or 0, flower large, sepals ovate-cordate, standard orbicular spurred behind, terminal lobe of wings very long pendulous, lip elongate saccate, spur short stout incurved.

Shaded woods of the SIKKIM HIMALAYA, alt. 5–7000 ft., and KHASIA MTS., alt. 3–6000 ft.; BHOTAN, at Duphla, *Booth;* BIRMA, at Momyen, *J. Anderson.*

Perhaps only a variety of *I. spirifer*, but a stronger growing plant, often much branched, leaves more strongly toothed, often ciliate at the base, petiole usually glandular, bracts, when present, very curiously twisted, lip deeper, and spur not spiral. *Capsule* 1 in., stout. *Seeds* orbicular, small, opaque, granulate.—I have found 4 lateral sepals on this species; it was the commonest Darjeeling one in 1848.

B III.—AXILLIFLORÆ.

* *Standard usually spurred at the back.*

95. **I. Jurpia,** *Ham. in Wall. Cat.* 4761; tall, shrubby, branched, glabrous or pubescent, leaves long-petioled elliptic-lanceolate caudate-acuminate often oblique crenate, peduncles very long 1–3-flowered, flowers large, bracteoles and sepals minute, standard obcordate usually with a long dorsal spur, terminal lobe of wings obovate or oblong, lip very large saccate, spur short stout incurved. *H. f. & T. in Journ. Linn. Soc.* iv. 140.

Shaded woods of the temperate and subtropical Himalaya from NIPAL to BHOTAN; KHASIA MTS., alt. 3–5000 ft.

Stem 5–8 ft., stout and woody below; branches glabrous or pubescent. *Leaves* 3–10 in., very membranous, many-nerved, with scattered hairs above, often red beneath, often ciliate towards the base; nerves numerous, slender; petiole usually long and slender, often glandular. *Peduncles* 2–4 in., slender; bracts subulate; pedicels ½–1 in. *Flowers* nearly 2 in. from the spur to the tip of the standard, white or pale straw-coloured or orange-red; standard with a spur sometimes ½ in. long, at others obsolete; wings small, lateral lobes rounded, included, terminal exserted, twice as large, notched at the tip or not, with an inflexed auricle on the inner margin; lip very large and broad, usually rounded at the base; spur stout, obtuse. *Capsule* 1–1½ in., narrow-linear, clavate, acute, glabrous. *Seeds* many, small, opaque, suborbicular, tubercled.—A splendid species, closely allied in flower to *I. spirifer*, *arguta*, and *discolor*. The peduncles are sometimes 9 in. long, and bear many alternate broad ovate small persistent thick bracts and no flowers. Amongst Cathcart's drawings of Darjeeling plants is a white-flowered species, probably a variety of this, with large bracts and a very short spur on the standard.

96. **I. discolor,** *Wall. Cat.* 4767; ? *DC. Prodr.* i. 687; slender, erect, branched, leaves petioled ovate or lanceolate acuminate crenate, peduncles short axillary 1–3-flowered, bracts broad ovate gland-tipped, flowers large, sepals rather large broadly ovate, standard orbicular spurred at the back, terminal lobe of wing large pendulous, lip very large deep conoidal narrowed into a short stout involute obtuse spur. *H. f. & T. in Journ. Linn. Soc.* iv. 137. I. Hoffmeisteri, *Klotzsch in Reise Pr. Waldem. Bot.* 121, t. 15 A.

Temperate NIPAL and SIKKIM HIMALAYA, alt. 6–8000 ft.

Glabrous, or pubescent on the leaves above. *Stem* 3–5 ft., decumbent and rooting at the base. *Leaves* membranous, crenatures coarse, with a bristle in the sinus; nerves many; petiole variable, naked. *Peduncle* and *pedicels* together 1–2 in., very slender, bracts $\frac{1}{12}$ in., scattered. *Flowers* 1½–2 in., violet-blue with a pink-purple veined very large lip; standard small; wings as in *I. arguta* and *spirifer*, which this much resembles in foliage and flowers, but differs wholly in the fruit. *Capsule* ¾ in., slender, clavate and acuminate beyond the middle, the lower portion being seedless. *Seeds* unripe.—A very common Darjeeling species. De Candolle describes the flower as yellow, so I suspect that he has had *I. urticæfolia* (or perhaps *I. flavida*) in his eye, with which species this has much in common; in this the leaves are more uniform, less crowded upwards and less drawn out at the apex; and the flowers are more uniformly lateral.

97. **I. spirifer,** *H. f. & T. in Journ. Linn. Soc.* iv. 135; erect, glabrous, or sparsely pubescent, leaves long-petioled ovate-lanceolate caudate-acu-

minate coarsely crenate upper sessile, stipules setose, peduncles 1–2, sepals large ovate-cordate, standard orbicular spurred behind, terminal lobe of wings very long pendulous, lip subcampanulate, spur short spiral, capsule long slender.

Temperate and subtropical woods of the SIKKIM HIMALAYA, alt. 4–7000 ft.

Stem 8–10 in., slender, sparingly branched. *Leaves* membranous, 1–3 in., narrowed into the slender cylindrical petiole, apiculate in the crenatures. *Peduncles* sometimes 2 and connate at the base, ebracteate, very slender, shorter or longer than the leaves. *Flowers* 1½ in. from the spur to the tip of the apiculate standard; wings violet-purple, the terminal lobe sometimes 1¼ in. long, elliptic-oblong; lip deeply conoidal, inflated, narrowed into the spiral spur, pale rose-coloured streaked with purple. *Capsule* 1 in., very slender. *Seeds* small, globose, puberulous.—A lovely plant, closely allied to *I. arguta*, but the flowers are almost invariably solitary, and it wants the curious united bracts.

98. **I. porrecta,** *Wall. Cat.* 7275; slender, quite glabrous, stem simple creeping below, leaves petioled ovate or lanceolate acuminate serrulate 2-glandular near the base, peduncles 2–3-flowered, bracts setaceous gland-tipped, sepals ovate-lanceolate, standard orbicular spurred at the back, terminal lobe of wings elongate pendulous, lip large conoid deep narrowed into a rather long abruptly hooked spur. *H. f. & T. in Journ. Linn. Soc.* iv. 138.

KHASIA MTS., *Wallich;* in marshes at Kala Panee, alt. 5–6000 ft., *J. D. H. & T. T.*

Stem simple, 12–18 in., succulent. *Leaves* 1½–2½ in., membranous, many-nerved; petiole 1–1½ in. *Peduncle* with the pedicels shorter than the leaves. *Flowers* large, 1½ in. long, pale yellow or straw-coloured, beautifully striated with red; standard and wings as in *I. discolor*, but the lip is very different, being almost triangular in profile, narrowed into a spur as long as itself. *Capsule* very immature, apparently not more than ½ in., acuminate.

99. **I. scabrida,** *DC. Prodr.* i. 687; glabrous or pubescent, leaves ovate or lanceolate acuminate serrate, stipules of two large glands, peduncles short 2–6-flowered, bracts setaceous, sepals broad ovate-cordate, standard very large orbicular spurred behind, wings smaller, lip conoidal as long as the incurved spur. *Wall. Cat.* 4769; *Wight Ic.* t. 323; *H. f. & T. in Journ. Linn. Soc.* iv. 136. I. tricornis, *Lindl. Bot. Reg.* 1840, t. 9; *Hook. Bot. Mag.* t. 4051. I. cristata *and* I. calycina, *Wall. in Roxb. Fl. Ind. Ed. Carey*, ii. 456 and 463. I. Hamiltoniana, *Don Prodr.* 204.

Shady woods of the temperate Himalaya, from KUNAWAR to BHOTAN, alt. 6–10,000 ft.

Robust, often much branched, 3–5 ft., rarely quite glabrous. *Leaves* 2–6 in., sessile or narrowed into the naked petiole. *Flowers* 1 in., golden-yellow, spotted with red, sometimes panicled, generally in several axils; peduncle 1–2 in., pedicels as long; standard cordate at the base, lateral lobe of wings short rounded, terminal much smaller, oblong. *Capsule* 1–2 in., slender, straight, ribbed, glabrous or puberulous. *Seeds* 1-seriate, oblong, scarcely tubercled.—De Candolle describes the spur as very long (longissimus), which is certainly not the case. I have no Sikkim specimen, but have a figure of the plant amongst Cathcart's drawings, which has 4 lateral sepals.

100. **I. tropæolifolia,** *Griff. mss.*; nearly glabrous, stem stout succulent branched, leaves petioled elliptic-obovate acuminate crenate-serrulate, peduncles succulent 2–3-flowered, flowers large yellow, sepals broad orbicular-ovate, standard orbicular thick green with a dorsal spur, wings very large clawed 2-lobed with an inflexed thickened auricle on the inner margin, lip funnel-shaped narrowed into a stout incurved spur.

MISHMI HILLS, *Griffith.*

Annual, a foot high; *stem* diaphanous, flexuous. *Leaves* 2–3½ in., rather thick, glabrous or sparsely puberulous above, white beneath, teeth with subspiral bristles, nerves slender; petiole ¼–¾ in.; stipular glands obsolete or 0. *Peduncles* 1½ in., apparently not stiff; bracts small, caducous; pedicels slender. *Flower* about 1 in. diam.; sepals acuminate, green; standard very coriaceous or fleshy; wings 1 in. long, claw broad, dilating first into a rounded lateral lobe, which is followed by twice as large a rounded terminal lobe; a curious incurved and thickend semilunar fold of the inner margin occurs opposite the union of the lobes; lip large; spur 1 in. long. *Fruit* unknown.—This fine species may belong to A v. in the short-fruited section.

** *Standard not spurred, but sometimes gibbous at the back.* (*See also* 100. tropæolifolia.)

101. **I. lævigata,** *Wall. Cat.* 4753; shrubby, erect, glabrous, leaves petioled elliptic- or obovate-lanceolate caudate-acuminate serrate, peduncles axillary very short stout, bracts large, flowers racemed and crowded or solitary yellow, sepals very large green orbicular, standard transversely oblong not spurred behind, wings short 2-lobed, lip funnel-shaped narrowed into a hooked spur of its own length or shorter. *H. f. & T. in Journ. Linn. Soc.* iv. 146.

Shaded woods in the Khasia Mts., alt. 3–5000 ft.

Stem 4–6 ft., woody below, branched; branches nodose, sometimes puberulous. *Leaves* 4–6 in., membranous, often oblique at the base, serratures with a bristle; petiole ½–1 in., sometimes glandular. *Peduncles* ½–1 in., usually crowded in the upper axils, stout, 1–4-flowered; bracts broadly ovate-cordate, obtuse, sometimes ½ in.; pedicels short, stout. *Flowers* 1–1½ in. long, pale yellow streaked with pink on the wings and lip; sepals very large indeed, sometimes ½ in. long, acute, very oblique; upper wing-lobes short, oblong, obtuse, lower almost twice as large, oblong, unequally 2-lobed, notched; lip and spur ¾–1 in.

102. **I. Cathcartii,** *Hook. f.;* erect, shrubby, branched, glabrous, leaves petioled elliptic or elliptic-lanceolate acuminate crenate, peduncles axillary long stout, bracts small, flowers laxly racemed large, sepals very large coloured orbicular, standard orbicular gibbous or spurred behind, wings short 2-lobed, lip saccate with a short stout incurved spur.

Shaded forests in the Sikkim Himalaya, alt. 3–5000 ft., *J. D. H.*

A large ramous species, nearest allied to *I. lævigata* in foliage and habit, but differing in the long very stout peduncled racemes, 3–7 in. long, smaller bracts, larger pink flowers 2–2½ in. long, with bright rose-coloured spur and standard; in the red (not green) sepals and more saccate lip.—As in *I. Jurpia* and other species the standard varies in being spurred or only gibbous at the back.

103. **I. serrata,** *Benth. in Wall. Cat.* 4771; glabrous, erect, simple or sparingly branched, leaves sessile or shortly petioled ovate-lanceolate acuminate sharply serrate eglandular, stipules glandular or 0, pedicel very slender forked in the middle 2-flowered, bracts setaceous scattered, sepals large broad, standard oblong clawed, wings clawed narrow, lip oblique conoid, spur about equalling the flower. *H. f. & T. in Journ. Linn. Soc.* iv. 136.

Shaded woods in the temperate regions of Nipal, *Wallich;* Sikkim, alt. 8–10,000 ft., and Bhotan, *Griffith.*

Stem slender, 1–3 ft. *Leaves* membranous, narrowed gradually into the petiole. *Flowers* ⅔–1½ in. long, yellow or white spotted with red; sepals very variable, sometimes very large, and almost orbicular; standard and wings apparently remote from the length of their claws; spur abrupt, recurved. *Capsule* 1–1½ in., very slender. *Seeds* numerous, narrow obovoid, strongly tubercled.—Allied to *I. scabrida*, but smaller, more delicate, with differently shaped lip, spur, and sepals.

104. **I. longipes,** *H. f. & T. in Journ. Linn. Soc.* iv. 150; quite glabrous, tall, branched, leaves distant shortly petioled elliptic-lanceolate caudate-

acuminate crenate, peduncles solitary axillary very long slender arcuate, raceme terminal 3–5-flowered, bracts subulate caducous, flowers 1 in. yellow, sepals 2–4 small, standard orbicular apiculate, wings with a long narrow twisted terminal lobe, lip trumpet-shaped, spur slender hooked.

Temperate SIKKIM HIMALAYA, alt. 8–10,000 ft., *J. D. H.*

A very distinct plant, 3–4 ft., with scattered uniform leaves and long axillary subhorizontal peduncles, 2–5 in. long. Stipules 0. *Stem* subtetragonous. *Leaves* 3–5 in., membranous, rather falcate; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Flowers* loosely racemed, pale yellow, unspotted; buds rounded at the apex. *Sepals* sometimes 4, ovate-lanceolate: lateral wing-lobe rounded, terminal 1 in., broadly subulate. *Capsule* not seen.—I have not cited any other habitat for this species but Sikkim; the Kumaon plants cited in Journ. Linn. Soc. being imperfect. In the form of the flower it is most allied to *I. laxiflora* and its allies.

105. **I. urticifolia,** *Wall. in Roxb. Fl. Ind. Ed. Carey*, ii. 457; *Cat.* 4768; simple or sparingly branched, quite glabrous, leaves large lower long-petioled elliptic-ovate caudate-acuminate coarsely crenate, peduncles axillary and subterminal very slender arched 3–5-flowered, bracts persistent slender, flowers large purple or yellow, sepals obliquely ovate, standard orbicular, wings 2-lobed, lip shortly saccate, spur short incurved or hooked. I. urticifolia, vars. *a* and *γ*, *H. f. & T. in Journ. Linn. Soc.* iv. 152.

Temperate Himalaya, NIPAL, *Wallich;* SIKKIM, alt. 10–12,000 ft., *J. D. H.*

Stem 2–3 ft., usually slender, and hardly branched. *Leaves* 4–6 in., upper sessile, membranous, tips long and quite entire; nerves many spreading, very slender; crenatures with subbasal bristles; petiole 1–3 in.; stipular glands sessile or pedicelled or 0. *Peduncles* 2–5 in., usually axillary, sometimes subterminal and clustered, always very slender, horizontal, and more or less arched; divided, as it were, at the top into 3–5-filiform pedicels, which, as well as the bracts (nearly $\frac{1}{4}$ in.), are very slender, and do not spread. *Flowers* yellow according to Wallich, white or pale purple with red streaks, in the Sikkim specimen, $\frac{3}{4}$ in. diam.; sepals oblique, long-pointed; standard obscurely keeled; wings with broad lateral lobes and elongate oblong terminal ones; spur almost as broad as deep, apiculate, base contracted but rounded, spur stout, obtuse. *Capsule* 1 in., inclined, linear, acuminate, glabrous. *Seeds* unripe.—This resembles a good deal *I. amphorata*, but is distinguished by its long, arched, filiform, usually horizontal, peduncles, which do not bear a raceme, but as it were divide into pedicels, and by its long slender bracts. It is most nearly allied to *I. longipes* and *I. cymbifera.* Wallich's description of the flower is imperfect, and I am unable to examine the wings of the dried specimens.

106. **I. cymbifera,** *Hook. f.;* slender, branched, quite glabrous, leaves petioled elliptic-ovate or lanceolate caudate-acuminate sharply crenate-serrate, peduncles axillary and subterminal much shorter than the leaves filiform 1–4-flowered, bracts large caducous, flowers large lilac, sepals large orbicular-ovate, standard orbicular gibbous behind, lateral wing-lobes rounded, terminal elongate-oblong conniving, lip broadly and deeply boat-shaped rounded below, spur 0. I. urticifolia *β*, *H. f. & T. in Journ. Linn. Soc.* iv. 152.

Inner valleys of the SIKKIM HIMALAYA; Lachoong river, alt. 8–10,000 ft., *J. D. H.*

Stem 2–3 ft., green with pale red-purple blotches; branches slender. *Leaves* 4–8 in., membranous, tip quite entire, crenatures or serratures very shallow, with a terminal or subterminal bristle; nerves many, arched, slender; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., winged; stipular glands sessile. *Peduncles* 1$\frac{1}{2}$–3 in., spreading, capillary; bracts $\frac{1}{3}$ in., boat shaped with long points; pedicels divaricating. *Flowers* 1–1$\frac{1}{4}$ in. long, pale lilac spotted with red; sepals nearly as long as the standard, acuminate, green on one (the upper) side of the midrib, lilac on the other; standard much vaulted, hardly, keeled; terminal wing-lobes horizontal, obtuse, conniving and parallel; lip $\frac{3}{4}$ in. long, ovoid in outline, apiculate, almost hemispherical below. *Capsule* ¾–1 in., linear, cuspidate, torulose, glabrous. *Seeds* few, young obovoid acute at the hilum, opaque.—Most nearly allied to *I. urticifolia*, Wall., differing in the acute small serratures of the leaves, short peduncles, caducous broad bracts, and the curious concave boat-like spurless lip.

B IV.—SUBUMBELLATÆ.

107. **I. bicornuta,** *Wall. in Roxb. Fl. Ind. Ed. Carey*, ii. 460; *Cat.* 4765; tall, stout, quite glabrous, leaves petioled elliptic or elliptic-lanceolate crenate caudate-acuminate, racemes subterminal interrupted, pedicels whorled, bracts narrow persistent, flowers rather large, sepals small, standard orbicular, wings caudate, lip horned at the tip produced downwards into a broad conoid or oblong incurved sac, spur short hooked or incurved. I. longicornu, *Wall. Cat.* 4729 *in part, not of Flor. Ind.* I. longicornu, *Wall.* var. *a*; *H. f. & T. Journ. Linn. Soc.* v. 148.

Central and Western Temperate Himalaya; NIPAL, *Wallich;* GARWHAL, *Strach. & Wint.*

A tall, leafy, much-branched annual; stem stout, succulent. *Leaves* 3–6 in., membranous, with sometimes a few scattered hairs on the upper surface, crenate, bristles 0 or basal; petiole 1–3 in., often with prominent basal stipular glands. *Peduncles* 2–4 in., rather stout, erect; racemes many-flowered; bracts whorled, ovate, with long prominent glandular tips; pedicels ¾–1 in., slender. *Flowers* ¾–1 in. long from tip of lip to that of standard; buds 2-horned by the spur and projecting glandular herbaceous end of the lip, which is large, broad, and remarkably incurved; wings with small lateral lobes and narrow terminal ones. *Capsule* (according to Wallich) 1½ in., cylindric, smooth, shining. *Seeds* 8–10, subcylindric.—Under Wallich's 4729 (*I. longicornu*) there is a fine specimen of this, together with one of *I. sulcata*, and another of *I. amphorata?* to neither of which does his character of the double-horned bud apply; and as the said fine specimen accords with another called *I. bicornuta*, but without a Catalogue number, in Wallich's Herbarium, collected in Nipal in 1821, and with his description of that plant in Roxburgh's Flora Indica, I retain the name here. The specimen in his Herbarium bearing the Catalogue name of *I. bicornuta*, has the spur rather more like that of *I. amphorata*, but it has not the broad sepals. The name *longicornu* in his Herbarium is inapplicable to any of the 3 plants in the sheet to which it is attached, and had best be suppressed; and all the more because it is not his own *I. longicornu* published in Roxburgh (which is De Candolle's, and his own *leptoceras*).

108. **I. amphorata,** *Edgew. in Trans. Linn. Soc.* xx. 39; erect, branched, slender or robust, glabrous, leaves petioled elliptic acuminate-crenate with glandular stipules, racemes subterminal subumbellately interrupted, bracts broad persistent, flowers large, sepals small broadly cordate, standard orbicular dorsally keeled or crested, wings with short lobes, lip a large deep broad rarely conical obtuse sac with a short abrupt incurved spur, capsule linear.

Western Temperate Himalaya, from KASHMIR to KUMAON, alt. 5–8000 ft.

The habit and foliage of this are quite those of *I. bicornuta*, but the petioles are more constantly 2-glandular at the base, with the glands either sessile or stipitate, the apex of the leaf is not so produced into an entire linear tail, the raceme is often hardly whorled or interrupted, the sepals are constantly cordate, and the lip is usually of a very different shape, being very large, subcylindric and saccate, rarely conoidal, and though at times apiculate, never having the strong callous green points which suggest the name of *bicornuta* for that plant. The flowers are, I believe, rose-coloured and yellow, with red veins; the lip, often ¾ in., is in one specimen from Simla, drawn out into a spur circinnate at the tip, and with the spur considerably over an inch long. The capsule is erect, ⅔–1⅔ in., linear, acuminate, not at all clavate. Seeds few, large, oblong, compressed; testa rugose.—The following varieties are distinguished as species by Mr. Edgeworth:—

VAR. 1. *amphorata proper;* stipular glands pedicelled, standard crested, wings unequally hatchet-shaped, lip very obtuse, spur incurved, capsule subterete. I. amphorata, *Edgeworth, l.c.* I. longicornu, *Wall. Cat.* 4729, *in part.* I. umbrosa, *Nob. in Linn. Soc. Journ.* I. picta, *Knowles & Wescott Floral Cabinet,* t. 128 (*according to a specimen in Herb. Lindley*).

VAR. 2. *umbrosa;* stipular glands sessile obtuse, pedicels glandular, lip gradually narrowed into the incurved spur, capsule subtorulose. I. umbrosa, *Edgew. in Trans. Linn. Soc.* xx. 39. I. longicornu, *var.* α and δ, *nob. l.c.* I. bicolor, *Royle Ill.* 151, t. 28. I. Roylei, *Klotzsch in Reise Pr. Wald.* 121, t. 15 B.

VAR. 3. *pallens;* stipular glands unequal ear-shaped, pedicels thickened eglandular, flowers smaller paler, lip gradually narrowed into a revolute spur. I. pallens, *Edgew. l.c.* 39. I. longicornu, *var.* pallens, *Nob. l.c.*

109. **I. Edgeworthii,** *Hook. f.;* tall, robust, branched, glabrous, leaves large petioled elliptic acuminate acutely serrate, peduncles subterminal fascicled, raceme short, interrupted, bracts large keeled persistent often whorled, flowers large yellow and red, sepals very large orbicular midrib crested, standard orbicular crested, lateral wing-lobes obliquely oblong, terminal oblong, lip funnel-shaped narrowed into an incurved spur. I. longicornu, var. γ cristata, *Nob. in Journ. Linn. Soc.* iv. 148.

Western Temperate Himalaya at Kundau and the Beas Valley in KULU, *Edgeworth.*

This resembles very closely *I. bicornuta* in habit, stature, and foliage, but the leaves are sharply serrate, the serratures tipped with glandular bristles, the sepals are very large, nearly ⅓ in. long, crested on the midrib, and the lip is broadly funnel-shaped, without the callous green points of that species. From *I. umbrosa* it differs in the same points (except the last). The stipular glands are tumid; the bracts boat-shaped, with long stiff glandular points; the flower 1 in. long from the tip of the standard to the spur; the sepals green, rest of the flower yellow streaked with red, except the broad crested midrib of the standard, which is green. Capsule and seeds as in *I. amphorata.*

110. **I. mishmiensis,** *Hook. f.;* quite glabrous, stem stout branched, leaves petioled elliptic-oblanceolate acuminate serrate, peduncles stout axillary, flowers large white in broken whorls, bracts large whorled persistent, sepals large broad ovate, standard orbicular obtusely spurred at the back, terminal wing-lobes elongate, lip funnel-shaped narrowed into a short incurved spur.

MISHMI MTS., *Griffith.*

A stout apparently succulent plant, 4 ft. high. *Leaves* 6 in., crowded towards the ends of the branches, membranous, sometimes gland-tipped, nerves very slender; petiole 1½–2 in.; stipular glands 0 or obsolete. *Peduncles* stout, shorter than the leaves; bracts in., spreading, acuminate, concave, green; pedicels ¾–1 in. *Flowers* few, more or less umbelled, about 1½ in. diam.; sepals and standard flesh-coloured; wings apparently clawed and 2-lobed, both lobes being narrow, the terminal larger, tinged with yellow, and with 2 yellow spots; lip large; spur about 1 in. *Capsule* unripe, 1–1¼ in., linear.

111. **I. radiata,** *Hook. f.;* tall, quite glabrous, much branched, leaves long-petioled elliptic-ovate or lanceolate acuminate crenate, peduncles fascicled towards the ends of the branches erect, pedicels very numerous more or less whorled, bracts persistent, flowers small yellow or purplish, sepals small, standard orbicular, terminal wing-lobe elongate, lip conical ending in a short straight spur. I. racemosa, *H.f. & T. in Linn. Soc. Journ.* iv. 147, *not of De Candolle and Wallich.*

Sikkim Himalaya, alt. 6–12,000 ft.; Khasia Mts., alt. 5–7000 ft.

A large leafy species, 3–5 ft., with copious inflorescence. *Leaves* 3–5 in., often fascicled towards the top of the stem, crenatures large, bristles basal; petiole ½–3 in., with two large stipuliform glands at the base. *Peduncles* 3–8 in., corymbosely crowded, strict, stiff, with 2–5 whorls of stiff spreading pedicels ½–2 in. long; bracts whorled, ¼–⅓ in., ovate, with long stout glandular points. *Flowers* ½ in. including the spur, yellow or purplish, bud rounded at the top; sepals lanceolate, with long points like the bracts; standard neither winged, keeled nor spurred; spur straight with a swollen tip, much shorter than the pedicel. *Capsule* ¾–1 in., strict, rarely inclined, usually in a line with the pedicel, linear, hardly at all clavate, glabrous. *Seeds* between obovoid and oblong, small and smooth or nearly so, apiculate at the hilum.—A very distinct plant, though in a dry state small specimens are indistinguishable from several of its allies in B. v. The Sikkim specimens have larger seeds than the Khasian.

B v.—Racemosæ.

* *Bracts deciduous; spur long, slender.*

112. **I. insignis,** *DC. Prodr.* i. 688; glabrous, stem simple robust, leaves sessile elliptic-lanceolate acuminate serrate thick, nerves many strong, peduncles subterminal usually numerous stout long erect, raceme terminal, bracts large caducous, flowers crowded red, sepals large, standard broadly oblong recurved, wings small 2-lobed, lobes short, lip conoidal tapering into a long curved spur. *Wall. Plant. As. Rar.* ii. 83, t. 194; *Cat.* 4766; *H. f. & T. in Journ. Linn. Soc.* iv. 150.

Nipal, *Wallich.*

Stem 1–2 ft., quite simple, very stout, hard, angled, swollen at the nodes, leafy. *Leaves* 2–5 in., almost coriaceous, serratures close-set, tipped with a stout bristle, midrib and nerves prominent, transverse nerves very distinct; stipules of 2 glands. *Peduncles* often crowded at the top of the stem, 4–8 in., rigid; bracts ¼ in., boat-shaped, acute; pedicels ¼–¾ in., erect in flower spreading in fruit. *Flowers* 1½ in., dark rose; sepals broad, acuminate; standard neither keeled nor spurred; lateral wing-lobes ovate, obtuse, terminal longer, oblong; lip with a stout point or horn, gradually contracting below into the flexuous spur, together 1 in. long. *Capsule* 1 in., narrow clavate, apiculate, glabrous, cernuous.—Specimens in the Wallichian Herbarium are labelled as from Silhet, but I suspect through some error.

113. **I. leptoceras,** *DC. Prodr.* i. 688; very robust, much branched, nodes close swollen, leaves sessile or petioled narrow lanceolate acuminate crenate-serrate, peduncles fascicled subterminal erect shorter than the leaves, flowers small (except the spur) crowded, bracts large boat-shaped with long points deciduous, buds rounded, sepals large obliquely ovate-cordate, wings 2-lobed with a short narrow claw, lip boat-shaped, spur very long slender. *Wall. Cat.* 4770. I. longicornu, *Wall. in Roxb. Fl. Ind. Ed. Carey*, ii. 462? *Miquel Ill. Flor. Archip. Ind.* 103. I. leptoceras var. *a*, *H. f. & T. in Journ. Linn. Soc.* iv. 153. I. odorata, *Don Prodr.* 213.

Nipal, or Sheopore, *Wallich.*—Distrib. ? Java (*Miquel*).

Stem 2–4 ft.? smooth, fleshy, as thick as the thumb below; branches with decurrent lines from the petioles. *Leaves* 5–6 in., very long-acuminate, serratures incumbent, with basal bristles; nerves not stout, and without transverse nervules; petiole ¼–1 in., with purplish stipular glands. *Peduncles* shorter than the leaves, stout, erect. *Flowers* yellow, fragrant, ⅓ in. diam.; bracts large, ¼–⅓ in., 3-nerved; pedicels 1 in. *Standard* broader than long; wings (I have given Wallich's description in the specific character); lip pointed, but not horned at the point; spur ascending or straight. *Capsule* detached, those in the Wallichian Herbarium, and consequently possibly not of this species, are 1–1¼ in., very narrow, acuminate, glabrous. *Seeds* unripe, oblong.—I find nothing resembling Wallich's original specimens in any other collection, in point of robustness, short internodes (1 in.), swollen nodes, leafiness, very long narrow leaves, few flowers terminating the short peduncles, and great length of spur. Amongst his distributed specimens under this name, however, are *I. racemosa*, *laxiflora?* and others. He has attached a mss. ticket of "*I. longicornu*, Wall." (along with the lithographed Catalogue ticket) to the original specimen, thus identifying this plant with that he described in the Carey Edition of Roxburgh's Flora Indica. In that work Wallich says he has received the same plant from Western Nipal, gathered by Dr. Govan; but there are no specimens of Govan's in his Herbarium, and I suspect that *laxiflora* or *racemosa* is here alluded to, which he has distributed under the same number, and which De Candolle probably describes as var. α. *I. leptoceras* resembles *I. insignis*, but the leaves are longer, less coriaceous, and want the strong transverse nervules so well marked in that plant; the peduncles are moreover much shorter, the flowers and sepals much smaller, the tip is not horned at the points, and the spur is far longer. De Candolle describes two varieties, α and β, with peduncles respectively longer and shorter than the leaves. The present plant is his β I suppose; his α being probably *I. laxiflora.* I have, however, retained his name, as being in accordance with Wallich's determination.

114. **I. tuberculata,** *H. f. & T. in Journ. Linn. Soc.* iv. 155; erect, branched, quite glabrous, leaves shortly petioled elliptic acuminate crenate, peduncles erect and pedicels short, bracts minute caducous, flowers small purplish, sepals falcate, standard orbicular, wings exserted broad obtuse, lip boat-shaped with a very short spur, capsule short clavate tubercled.

Temperate and Subalpine SIKKIM HIMALAYA, alt. 10–13,000 ft., *J. D. H.*

Stem 2–3 ft., succulent. *Leaves* 2–4 in., more or less fascicled as if whorled at the ends of the branches, rather thick, bristles of the serratures basal, nerves many, diverging; petiole ¼–½ in.; stipular glands obscure or 0. *Peduncles* 1–1½ in.; racemes not interrupted, 4–8-flowered; pedicels ¼–⅓ in. *Flowers* ⅓ in. diam.; sepals much curved, very small; standard orbicular, very concave, keeled at the back; lateral wing-lobes orbicular, terminal produced (I think); lip apiculate; stem broad short. *Capsule* ½ in., erect or horizontal, 5-angled, valves with 2 series of pustules or tubercles; tip obtuse, with a curved spur or beak. *Seeds* ⅛ in., oblong, narrow, compressed; testa spongy, wrinkled, brown.—A very well marked species, by the shortly petioled leaves with basal bristles in the crenatures, short peduncles and pedicels, peculiar capsules and large seeds.

115. **I. stenantha,** *Hook. f.*; tall, much branched, quite glabrous, leaves petioled elliptic-ovate or lanceolate acute or caudate-acuminate crenate, peduncles axillary and terminal, bracts caducous, flowers yellow, buds beaked at the rounded or subacute tip, sepals small narrow, standard recurved, lateral wing-lobes oblong, terminal narrow elongate acute or obtuse, lip trumpet-shaped horned at the very oblique mouth, narrowed into a long slender spur.

SIKKIM HIMALAYA and E. NIPAL, common, alt. 6–8000 ft.; KHASIA MTS., alt. 5–6000 ft., *Griffith*, &c.

Usually tall, erect, much branched. *Leaves* 2–6 in., crenatures with basal or subbasal bristles; petiole ½–3 in.; stipular glands sessile or stipitate on the stem or petiole. *Peduncles* slender, shorter or longer than the leaf; racemes short; bracts setaceous, caducous long before the expansion of the flower. *Flowers* yellow, often speckled with red; bud 1 in. long, with a long terminal green beak; sepals sometimes 4; standard orbicular or oblong; wings with sometimes a twisted acute terminal lobe nearly as long as the spur, which is sometimes clubbed at the tip. *Capsule* ½ in., narrow clavate, acuminate, glabrous. *Seeds* small, obovoid, compressed, opaque.—I long hesitated before separating this from *I. angustiflora*, but the constantly caducous bracts both in Sikkim and the Khasia Mountains seem to indicate an important difference, which will no doubt be confirmed when the structure of the flower is better known.

VAR. 1; leaves large elliptic caudate-acuminate, terminal wing-lobes acute flat recurved or twisted.—Sikkim.

? VAR. 2; leaves small obtuse or subacute, peduncles few longer than the leaves, terminal wing-lobe strap-shaped obtuse, flowers orange-yellow speckled with red, mouth of lip hardly horned.—I. leptoceras, var. β, *H. f. & T. in Journ. Linn. Soc.* iv. 153, Khasia Mts., at Myrung and Nonkrim—perhaps a different species.

** *Bracts persistent; spur long, slender.*

116. **I. racemosa,** *DC. Prodr.* i. 688; erect, quite glabrous, slender, branched, leaves petioled elliptic-ovate or lanceolate acuminate crenate, peduncles lateral and subterminal slender erect, bracts persistent, flowers ⅓–½-in., sepals ovate, standard orbicular, wings with a filiform process descending into the spur, lip boat-shaped with a curved spur equalling the pedicel. I. racemosa, *Wall. Cat.* 4730 *in part;* I. tingens, *Edgew. in Trans. Linn. Soc.* xx. 41; *H. f. & T. in Journ. Linn. Soc.* iv. 151. I. micrantha, *Don Prodr.* 203.

Temperate Himalaya; from SIMLA, alt. 5–7000 ft., to SIKKIM, alt. 6–12,000 ft.

Stem 2–3 ft. high, sometimes glandular above. *Leaves* 3–9 in., membranous, crenatures with a bristle in the sinus or near it; petiole ½–2 in., slender, naked or with 2 sessile or pedicelled stipular glands at the base. *Racemes* usually exceeding the leaves, not interrupted, lax, 6–10-flowered; bracts ovate, with stout glandular points; pedicels slender. *Flowers* small (½ in.), yellow; sepals very variable, ovate or oblong, with points like the bracts; standard not spurred or winged; wings narrow, pendulous, lateral lobes orbicular, terminal broadly strap-shaped, obtuse, with a basal rounded auricle externally, a slender almost filiform process, with a glandular tip, descends from the inner margin of each wing into the spur. *Capsule* ½–¾ in., linear-clavate, acuminate, glabrous. *Seeds* large, oblong, compressed, rugose.—A careful examination of those specimens of Wallich's *I. racemosa* that agree with De Candolle's description, prove its identity with Edgeworth's *I. tingens*, both having the curious filiform process of the wings concealed in the spur; and this obliges me to alter the nomenclature adopted in the Linnean Journal, together with the description, as far as the Khasian specimens (which must be excluded) are concerned. I have failed to prove the existence of the said processes in the dried Sikkim specimens, which are in a very unsatisfactory state for an analysis of such delicacy as that of the spur; but I think I detect their presence. The plant varies extremely in size of all its parts, but is always small-flowered. Some of Wallich's specimens have linear-lanceolate bracts. There are two sheets marked *I. racemosa* in Wall. Herb., and on both are specimens of this, and of what is either *I. radiata* or a small state of *I. bicornuta.* The plant distributed by Wallich to the Hookerian and Benthamian Herb., is that here described. Edgeworth (Trans. Linn. Soc.) describes the standard as keeled and crested, which I do not find to be the case in his specimen, which precisely accords with Wallich's.

117. **I. laxiflora,** *Edgew. in Trans. Linn. Soc.* xx. 40; tall, branched, quite glabrous, leaves petioled elliptic-lanceolate acuminate crenate, peduncles subterminal slender fascicled, bracts persistent lanceolate, pedicels slender, flower ½ in. yellowish, buds rounded at the end, sepals small, standard orbicular, lateral wing-lobes rounded or oblong terminal rounded or elongate, lip conical apiculate narrowed into a long usually curved spur.

Temperate Himalaya, alt. 5–10,000 ft. from SIMLA to SIKKIM; KHASIA MTS., alt. 5–6000 ft.

Stem 2–4 ft., slender. *Leaves* 3–5 in., membranous, crenatures rounded with basal or subbasal bristles, nerves slender; petiole 1–3 in.; stipular glands various. *Peduncles* usually exceeding the leaves, slender; bracts small, narrow; pedicels not whorled or fascicled, spreading. *Flowers* together with the spur, about 1 in.; sepals usually small and narrowly ovate; standard not crested nor spurred at the back; wings very variable (if the following varieties all belong to one species); lip without a stout callous tip; spur straight or conical, tip often clubbed. *Capsule* ⅔–1 in., narrowly clavate, mucronate, glabrous. *Seeds* oblong, rugose, compressed, brown.—I have made this to include the common Himalayan *Impatiens* of the group with much larger flowers than *racemosa*, crenate leaves, rounded tips to the buds, a long slender spur, and persistent narrow bracts; whether all the following varieties are referable to it cannot be determined from dried specimens. Edgeworth's specimens in Herb. Bentham are not in an examinable state. It differs from *I. leptoceras* (to which I had referred various of the forms) in the broader shorter leaves, persistent bracts, and habit of growth; from *I. angustiflora*, in the rounded buds and lip not ending in a beak; and from *I. stenantha* by the same characters and persistent bracts.

Var. 1. *Edgeworthii;* stipular glands 3–4 on each side of the petiole sessile, standard mucronate at the back, lateral wing-lobes obovate erect spotted yellow, terminal flat lanceolate rosy or purple?, spur straight white spotted yellow and purple.—I. laxiflora, *Edgew. l.c.* Banks of streams at Sevaria, alt. 7–9000 ft. Kumaon, *Strach. & Wint.* (Imp. 19).

Var. 2. *Stracheyi;* stipulary glands various, flowers yellow, lateral wing-lobes large rounded spreading, terminal short, narrower obtuse.—Simla, *T. T.;* Birma, 7300 ft., *Madden;* Jagesur and Naintal, in Kumaon, *Str. & Wint.* (Imp. 3); Sikkim, at Choongtam, *J. D. H.*

Var. 3. *sikkimensis;* stipular glands several small or 0, standard green with purple spots, wings lilac spotted with purple, lip yellow-green.—Sikkim at Lachoong, alt. 9000 ft.

Var. 4. *khasiana;* stipular glands 0 or sessile or pedicelled, flowers pale-yellow, lateral wing-lobes small spreading rounded, terminal with a very broad rounded basal-lobe on the outer margin and tongue-like obtuse apex.—Khasia, not common at Pomrang, Nunklow, Sururcem and Molim. I. leptoceras var. *a* in part. *H. f. & T. in Journ. Linn. Soc.* iv. 153.

118. **I. paludosa,** *Hook. f.;* small, sparingly leafy, quite glabrous, leaves shortly petioled elliptic-ovate or lanceolate acute or obtuse crenate-serrate, peduncles 1–2 much longer than the leaves 2–4 flowered, bracts broad boat-shaped, flowers yellow, buds rounded, sepals orbicular-ovate, standard orbicular, lateral wing-lobes small spreading rounded, terminal very large spreading lobed at the side obtuse, lip boat-shaped apiculate narrowed into a long slender incurved spur. I. leptoceras, *var.* ζ *H. f. & T. in Journ. Linn. Soc.* iv. 153.

Khasia Mts.; marshes near Nonkrim and Pomrang, alt. 5–6000 ft., *J. D. H. & T. T.*

Stem 4–10 in., rather rigid. *Leaves* 1–2 in., rather distant, thickish, crenatures with basal bristles; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* 1–3 in., terminal and lateral; bracts $\frac{1}{6}$ in., spreading or reflexed. *Flowers* with the spur 1–1$\frac{1}{4}$ in.; sepals more than half as long as the keeled standard; terminal wing-lobes about $\frac{1}{2}$ in. broad; spur clubbed at the tip. *Capsule* $\frac{2}{3}$ in., cylindric, apiculate, glabrous. *Seeds* minute, subobovate, pointed at the hilum, rough, opaque.—I was long disposed to rank this merely as a form of *I. laxiflora*, but besides that the habit is very different, the leaves are small, rather coriaceous, not long-acuminate, the peduncles are few and few-flowered, the bracts very broad and boat-shaped, with short stiff glandular points, the sepals are much longer and broader, and the capsule shorter.

119. **I. angustiflora,** *Hook. f.;* simple or branched, quite glabrous, leaves petioled elliptic-ovate or lanceolate caudate-acuminate crenate, peduncles subterminal clustered slender erect, bracts small lanceolate persistent, flowers yellow narrow, buds acuminate, sepals small, standard orbicular or oblong, lateral wing-lobes small, terminal elongate, lip trumpet-shaped horned at the very oblique tip narrowed into a long slender curved spur. I. leptoceras η, θ, *H. f. & T. in Journ. Linn. Soc.* iv. 153.

Khasia Mts., alt. 5–7000 ft., *Lobb*, &c.; Bhotan, *Griffith.*

Very similar to *I. laxiflora*, but at once distinguished by the narrow acute buds, due to the very oblique mouth of the lip, which ends in a green strong subulate process, whence the unexpanded flower has a remarkably narrow form with a beaked tip; in this respect it agrees with *I. stenantha*, which differs in the deciduous bracts. The wing-lobes vary much in breadth, and in var. 2 the terminal-lobes are inflexed, crossing one another; in var. 1 the form of the wing-lobes cannot be determined; stipular glands sessile or pedicelled or 0.

VAR. 1; stem slender, branched, leaves elliptic-ovate.—Surureem in woods. ? Bhotan.

VAR. 2; stem very robust shorter sometimes narrowly-winged above, leaves longer narrow-lanceolate.—Moflong.

120. **I. micranthemum,** *Edgew. in Trans. Linn. Soc.* xx. 40; quite glabrous, stem slender branched with scattered glands, somewhat winged by the decurrent petioles, leaves petioled elliptic-ovate acuminate crenate, peduncles subterminal fascicled and axillary very slender, bracts lanceolate persistent, flowers ½ in. white, sepals small narrow, standard orbicular, wings conniving, lateral lobes elliptic, terminal rounded, lip tubular narrowed into a slender straight spur. *H. f. & T. in Journ. Linn. Soc.* iv. 154, *under* I. laxiflora.

Temperate Western Himalaya; SIMLA, alt. 6–10,000 ft., *Edgeworth, Thomson.*

A tall slender pale succulent plant, with difficulty distinguished in a dry state from *I. laxiflora*, except by the smaller flowers and straighter spur. *Leaves* 3–4 in., very rarely opposite, flaccid, with often 2 glands at the base of the blade, crenatures with basal bristles, upper subsessile; stipular gland stipitate. *Peduncles* longer or shorter than the leaves; racemes many-flowered; pedicels ½–1 in., capillary. *Flowers* white; standard with yellow and red spots. *Capsule* horizontal, ½–⅔ in., linear, apiculate, glabrous. *Seeds* oblong, rugulose.—I can find no valid characters in the description given whereby to separate *I. elata;* both are probably forms of *I. brachycentra*, to which Edgeworth's var. β of *I. micranthemum* may be referable.

VAR. 1; bristles of crenatures basal, pedicels glandular. I. micranthemum, *Edgew. l.c.*

VAR. 2; bristles of crenatures subapical, pedicels glandular. I. elata, *Edgew. l.c.* 41.

* *Bracts persistent, spur short or* 0.

121. **I. brachycentra,** *Kar. & Kir. in Bull. Soc. Nat. Mosc.* 1842, i. 179; erect, slender, branched, quite glabrous, leaves long-petioled elliptic acuminate crenate-serrate, peduncles fascicled at the top of the stem stout erect, racemes many-flowered, bracts minute persistent, flowers minute pale, sepals ovate obtuse concave, standard broadly obovate, wings rather long, lateral lobes rounded, terminal produced 2-lobed, lip boat-shaped with a very short straight conical spur.

Western temperate Himalaya, alt. 7–10,000 ft., from KUNAWUR, *Jacquemont,* to MARRI, *Fleming.*—DISTRIB. Soongaria.

Annual, 1–2 ft. *Stem* usually naked below, not winged. *Leaves* 2–5 in., very membranous, teeth tipped with a bristle, nerves many, very slender; petiole ½–1 in., slender, often with 2 sessile or stipitate stipular glands. *Peduncles* usually very numerous, 1–3 in., very slender, mostly subterminal, with a few reduced lateral ones in the lower axils; bracts setaceous; pedicels capillary. *Flowers* ¼ in., whitish; sepals large for the size of the flower; standard not keeled or spurred. *Capsule* ½–⅔ in., narrow clavate, acute, membranous, glabrous. *Seeds* few, oblong, pyriform, compressed, rugulose. The bristles of the teeth of this species are distinctly apical.—I. elata, *Edgew.* (*Trans. Linn. Soc.* xx. 41) differs according to the description in the distinct spur, in being dotted with black glands, and having glandular tips to the pedicels. (See under *I. micranthemum.*)

122. **I. depauperata,** *Hook. f.;* low, slender, very much branched, quite glabrous, leaves small shortly petioled elliptic-ovate or lanceolate acuminate-crenate, racemes axillary few-flowered, bracts persistent, flowers

minute yellow, sepals ovate, standard orbicular, wings short, lip boat-shaped with a gibbosity or boss in place of a spur.

KHASIA MTS., alt. 5–6000 ft., at Surureem on walls, *Griffith;* at Molim, *J. D. H. & T. T.*

Like a very small form of *I. racemosa,* but the flowers are not ⅛ in. diameter and are not spurred. I should have referred it to a reduced form of this plant with minute flowers arrested in development, had it occurred in the Himalaya, but the widely-sundered habitat obliges me to regard it as distinct.—*Capsule* ½ in., narrow-clavate, glabrous. *Seeds* small, obovate, compressed, pointed at the hilum.

OF DOUBTFUL AFFINITY.

123. **I. glauca,** *H. f. & T. in Journ. Linn. Soc.* iv. 155; tall, stout, erect, quite glabrous, very glaucous throughout, leaves long-petioled ovate-oblong or cordate coarsely crenate white beneath, peduncles axillary and terminal very long and stout, raceme not interrupted.

Western temperate Himalaya, at Dwali in KUMAON, alt. 9500 ft., *Strach. & Wint.*

Stem very stout, the base of the branch in the Herbarium, which is almost 2 feet long, being as thick as a swan's quill and much contracted, as if succulent when fresh. *Leaves* 2 in., very obtuse, quite white beneath, membranous, nerves few arched, crenatures with subterminal cilia or none; petiole ½–¾ in., with a large scutellate gland at the outer base, which is also present at an analogous position on the peduncle. *Peduncles* many, 5 in., erect or ascending, the upper fascicled (as if branched); raceme terminal, 6–8-flowered; bracts caducous; pedicels stout, ⅝ in., fruiting ones spreading, much thickened at the tip. *Capsule* 1½ in., inclined, linear-clavate, glabrous. *Seeds* several, large, oblong, rugulose.—Of this very singular species I have seen but one mutilated flowerless specimen; it is wholly covered with a glaucous secretion of the epidermis, very much as in *Rubus biflorus;* the long-petioled leaves not narrowed into the petiole, with coarse crenatures, resemble those of *I. Noli-me-tangere;* it is evidently a tall much-branched plant.

[The following species has been published by Major Beddome in a number of the *Icones,* which did not reach England until after Part II. had appeared.]

33 *bis.* **I. Ballardi,** *Bedd. Ic. Pl. Ind. Or.* 44, t. 192; slender, rooting below, nearly glabrous, leaves alternate and opposite petioled ovate serrate, base with glandular cilia, peduncles slender axillary and terminal much exceeding the leaves, flowers subumbellate, sepals ovate-subulate, standard orbicular concave, wings dimidiate-lanceolate acute spreading, the lobes separated by a notch only, lip boat-shaped with a very short straight spur which is inflated in the middle and subulate at the tip.

Mountains of TRAVANCOR, near Permeede, at 2–3500 ft., *Beddome.*

A slender herb, 1–1½ ft. *Stem* glabrous. *Leaves* 1–2 in, nerves 3 or 4 on each side, slightly hairy above, glabrous beneath; petiole ¼–⅜ in. *Peduncles* 2–3½ in., subglabrous, 5–8-flowered; pedicels slender, bracts minute. *Flower* ¾ in. long; standard obscurely keeled, spur as long as the wings. *Capsule* ovoid, swollen, subglabrous, 7–10-seeded *Seeds* with weak hairs.—Description taken from Beddome's characters and plate quoted above, where it is stated that it is allied to *I. Goughii,* but has much larger flowers and differently shaped petals.

DOUBTFUL SPECIES.

I. SEMIVERTICILLATA, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, i. 594. Annual, erect, glabrous, branched; leaves opposite and often 3-nately whorled, lower long-petioled, upper sessile, attenuate at both ends, repand-crenate, with a bristle between the crenatures; peduncles axillary, 1-flowered, as long as the leaf, lower solitary, upper fascicled;

spur exceeding the flower; capsule cylindric, often incurved.—Nilghiri Mts., *Perrotet, n.* 187.

I. CLAVICORNU, *Turcz. l.c.* 1859, i. 271. The description will apply to any of the long-spurred species of group A 1.

I. DEBILIS, *Turcz. l.c.* 1859, i. 271, may be *I. tenella* or any of its allies.

I. ASSAMENSIS, *Griff. Not. Pl. Asiat.* iv. 459, t. 576, f. 1. It is impossible to say what plant is meant here. The description answers best to *I. stenantha* in its habit, very long peduncles, small flowers, and glabrous foliage, &c.; but the figure cited is that of a very robust and very pubescent plant (like *I. scabrida*), with an immense flower, totally differing from the description in every respect.—Banks of the Burrampoota in sandy places near Dibong Mookh, *Griffith.*

I. MALAYENSIS, *Griff. l.c.* 457, t. 576, f. 2. From the imperfect description this is probably one of the forms of *I. Balsamina.*—Mergui, *Griffith.*

I.? From Ramgunga in Kumaon, alt. 7200 ft., *Strach. & Wint.*—Resembles *I. laxiflora,* Edgew., but has very broad green sepals.

I.? Baltal in Kashmir, *T. Thomson;* and Marri, *Fleming.*—Probably a form of *I. amphorata* or *I. bicornuta.*

I.? Marri, *Fleming.*—Probably a form of *laxiflora,* but the leaves are sharply serrate and buds larger.

I.? Khagump, *Griffith* (? Khagumpa in Bhotan).—A suffruticose species with the habit of *I. lævigata,* but flowers twice as large, and the very large standard herbaceous and crested; wings apparently rounded; lip large, deeply boat-shaped; spur stout, clubbed at the tip.

9. **HYDROCERA,** Blume.

A glabrous erect marsh herb. *Leaves* narrow, alternate. *Flowers* in short axillary 1–2-flowered peduncles, irregular. *Sepals* 5, coloured, imbricate; 2 outer lateral, flat; posticous one produced into a short hollow spur. *Petals* 5, the anticous outer, very large, concave. *Disk-glands* 0. *Stamens* 5, filaments short flat; anthers slightly cohering around the pistil. *Ovary* 5-celled; stigmas 5 sessile; ovules 2–3 in each cell. *Drupe* baccate, stone bony truncate 5-celled, cells 1-seeded. *Seeds* curved, corrugated, albumen 0; cotyledons plano-convex, thickish, radicle short superior.—DISTRIB. One tropical Asiatic species.

1. **H. triflora,** *W. & A. Prodr.* i. 140; *H. f. & T. in Journ. Linn. Soc.* iv. 156. H. angustifolia, *Blume Bijd.* 241. Impatiens triflora, *Linn. DC. Prodr.* i. 687; *Wall. Cat.* 4756. I.? natans, *Willd.; DC. Prodr.* i. 687; *Roxb. Fl. Ind.* i. 652; *Wall. Cat.* 4755. Tytonia natans, *G. Don, Gen. Syst.* i. 749; *Burm. Fl. Zeyl.* t. 16 (*inaccurate*).

Throughout BENGAL, the EASTERN and WESTERN PENINSULA, CEYLON and BIRMA, in marshes.—DISTRIB. Java.

Annual. *Stem* floating, fistular, flexuous, rooting at the nodes, often many yards long; branches 1–2 ft., erect, 5-angled, as thick as the finger. *Leaves* 1–5 in., linear-lanceolate, serrate, sessile; stipular glands 2. *Peduncles* short, usually 3-flowered; bracts oblong. *Flowers* 1 in. diam., variegated red, white, and yellow. *Drupe* subglobose, as large as a cherry, smooth, red, succulent.

ORDER XXXIII. **RUTACEÆ.** (By J. D. Hooker.)

Trees or shrubs, rarely herbs, abounding in pellucid glands filled with essential oil (except *Peganum*). *Leaves* opposite or alternate, simple or compound, exstipulate. *Flowers* in axillary or terminal cymes or panicles, (racemed in *Dictamnus*), never spiked, usually bisexual and regular in the Indian species (except *Dictamnus*). *Calyx* of 4–5 small lobes or sepals. *Petals* 4–5, hypogynous (in the Indian genera), valvate or imbricate. *Stamens* 4–5 or 8 or 10, rarely more (*Citrus*, *Ægle*), or 6 (*Bœnninghausenia*), filaments usually free, hypogynous; anthers 2-celled, opening inwards. *Disk* within the stamens, crenate or lobed, sometimes large or long. *Ovary* of 4–5 free or connate carpels; styles as many, free or variously united, stigmas terminal, entire or lobed; ovules usually 2 in each cell. *Fruit* a capsule, berry or drupe, or of 1–4 capsular cocci. *Seeds* usually solitary in the cells, testa various, albumen fleshy or 0; embryo straight or curved, radicle superior.—DISTRIB. Tropical and extratropical plants; many are S. African and Australian. Genera 83, and about 650 species.

TRIBE I. **Ruteæ.** Herbs, rarely shrubby. *Flowers* hermaphrodite. *Disk* thick. *Ovary* deeply 3–5-lobed; styles basilar or ventral, free or united; cells 3- or more ovuled. *Fruit* capsular. *Albumen* fleshy; embryo usually curved.

* *Flowers regular.*

Petals 4–5. Stamens 8–10. Ovary sessile	1. RUTA.
Petals 4. Stamens 6–8. Ovary pedicelled	2. BŒNNINGHAUSENIA.
Petals 4–5. Stamens 12–15	3. PEGANUM.

** *Flowers irregular.*

4. DICTAMNUS.

TRIBE II. **Zanthoxyleæ.** Shrubs or trees. *Flowers* usually polygamous. *Disk* free, rarely 0. *Ovary* deeply 2–5-lobed; styles basilar or ventral, more or less free; cells 2-ovuled. *Fruit-carpels* capsular.

Leaves opposite. Stamens 4–5	5. EVODIA.
Leaves opposite. Stamens 4, with 4 staminodes opposite the petals	6. TETRACTOMIA.
Leaves opposite. Stamens 8	7. MELICOPE.
Leaves alternate. Stamens 3–5	8. ZANTHOXYLUM.

TRIBE III. **Toddalieæ.** Shrubs or trees. *Flowers* usually polygamous. *Disk* free. *Ovary* entire; style single; cells 1–2-ovuled. *Fruit* syncarpous. *Seed* albuminous; cotyledons usually flat.

Stem usually prickly. Leaves compound. Petals and stamens 2–5 each	9. TODDALIA.
Stem unarmed. Leaves 1–3-foliolate. Petals 4. Stamens 8	10. ACRONYCHIA.
Stem unarmed. Leaves simple. Petals and stamens 4–5 each	11. SKIMMIA.

TRIBE IV. **Aurantieæ.** Shrubs or trees. *Flowers* hermaphrodite. *Petals* and *stamens* free or connate. *Ovary* entire; style simple; cells 1–∞-ovuled. *Berry* usually pulpy. *Seed* exalbuminous.

* *Ovules solitary or twin in each cell.*

Style very short, persistent	12. GLYCOSMIS.

Unarmed. Leaves pinnate. Style jointed on the top of the ovary, deciduous.
  Petals valvate. Filaments linear-subulate. Cotyledons leafy, crumpled . . . . 13. MICROMELUM.
  Petals imbricate. Filaments linear-subulate. Cotyledons fleshy, plano-convex . . . . 14. MURRAYA.
  Petals imbricate. Filaments dilated below. Cotyledons fleshy, plano-convex . . . . 15. CLAUSENA.
Armed (except some species of *Limonia*). Leaves 3–8-foliolate.
  Calyx 3-lobed. Stamens 6 . . . . 16. TRIPHASIA.
  Calyx 4–5-lobed. Stamens 8 or 10 . . . . 17. LIMONIA.
  Calyx cupular. Stamens 8 or 10 . . . . 18. LUVUNGA.
Unarmed or armed. Leaves 1-foliolate.
  Anthers linear-oblong. Disk elongate . . . . 19. PARAMIGNYA.
  Anthers ovate or cordate. Disk cupular . . . . 20. ATALANTIA.

** *Ovules many in each cell.*

Stamens 20–60. Ovary ∞-celled. Leaves 1-foliolate . . 21. CITRUS.
Stamens 10–12. Ovary incompletely 5–6-celled. Leaves pinnate . . . . 22. FERONIA.
Stamens 30–60. Ovary 8–∞-celled. Leaves 3-foliolate . 23. ÆGLE.

1. **RUTA,** Linn.

Strong-smelling herbs, sometimes shrubby below. *Leaves* alternate, simple or compound. *Flowers* in terminal corymbs, cymes, or panicles, greenish or yellow. *Calyx* short, 4–5-partite or -lobed, persistent. *Petals* 4–5, concave, often toothed or ciliate, imbricate. *Stamens* 8–10, inserted round the base of a thick 8–10-glandular or pitted disk, the alternate shorter. *Ovary* 3–5-lobed and -celled; style central, basilar; ovules pendulous from the axis of the cells. *Capsule* 4–5-lobed, lobes indehiscent, or dehiscing at the apex. *Seeds* angled, testa pitted, albumen fleshy; embryo slightly curved, cotyledons sometimes 2-partite.—DISTRIB. About 40 species, chiefly Mediterranean and W. Asiatic.

SUBGEN. 1. **Ruta** *proper. Flowers* 4-merous. *Petals* usually toothed or laciniate. *Filaments* glabrous. *Ovules* many. *Leaves* pinnate or decompound.

R. GRAVEOLENS, *Linn.; var. angustifolia;* leaves petioled triangular-ovate decompound, segments various, corymbs spreading, bracts lanceolate, sepals triangular acute, petals ciliate, capsule obtuse shortly pedicelled. R. angustifolia, *Pers.; W. & A. Prodr.* 146. R. chalepensis, *Wall. Cat.* 7113.

Cultivated in INDIA.—DISTRIB. Westward to the Canaries.

One or more forms of the common Rue are cultivated in India, and hence introduced into Botanical works. Wallich says of the plant described as *R. angustifolia*, Pers., by W. & A., that it is from a Mr. Stevenson's garden at Tranquebar.

SUBGEN. 2. **Haplophyllum.** *Flowers* 5-merous. *Petals* quite entire. *Filaments* pilose. *Ovules* few or many. *Leaves* simple or 3-sect.

1. **R. tuberculata,** *Forsk.;* stem erect or ascending glabrous, branchlets and inflorescence puberulous and glandular, leaves oblong linear-oblong or somewhat spathulate pubescent. *Boiss. Flor. Orient.* i. 939.

Boogta hills in SINDH, *Vicary*.—DISTRIB. Westward to Egypt and Algeria.

Stem terete, woody, branched, minutely glandular. *Leaves* scattered, $\frac{1}{2}$–1 in., coriaceous, pustular and pubescent, nerveless. *Cymes* dichotomously branched, divisions pubescent and glandular. *Flowers* $\frac{1}{4}$ in. diam., the centre one of each cymule sessile, the others shortly pedicelled. *Sepals* very short broad, obtuse. *Petals* fimbriate.—The specimens are not in a good state, but I believe them to be referable to this species.

DOUBTFUL SPECIES.

RUTA (HAPLOPHYLLUM), sp., *Aitchison* (*Cat. Punjab and Sindh Pl.* 30) from Peshawur (*Stewart*) is undeterminable.

2. BŒNNINGHAUSENIA, Reichb.

A perennial-rooted herb. *Leaves* alternate, 2-pinnate, leaflets quite entire. *Flowers* in compound terminal leafy panicled cymes, white, pedicels slender. *Calyx* 4–5-lobed, persistent. *Petals* 4–5, obovate-oblong, imbricate. *Stamens* 6–8, inserted at the base of an urceolate disk, filaments filiform, the alternate shorter; anthers oblong. *Ovary* long-stipitate, 3–5-lobed, narrowed below, lobes 1-celled distant; styles 3–5, ventral, connate, stigma simple; ovules 6–8 in each cell, pendulous from the middle of the axis. *Fruit* of 6–8 free membranous ventrally dehiscing few-seeded carpels. *Seeds* reniform, testa black granulate, albumen fleshy; embryo arcuate.

1. **B. albiflora,** *Reich. Conspect.* 197. Ruta albiflora, *Hook. Exot. Flor.* t. 79; *Wall. Cat.* 1203. R. japonica, *Sieb.*

TEMPERATE HIMALAYA, from Marri to Sikkim, alt. 4–8000 ft.; KHASIA MTS., alt. 4–6000 ft.—DISTRIB. Japan.

A slender erect branching perennial-rooted herb, 1–2 ft., glabrous or somewhat pubescent. *Leaves* 2–3-pinnate; petiole slender; leaflets $\frac{1}{4}$–$\frac{3}{4}$ in., obovate or obcordate, glaucous beneath, membranous, the terminal largest, petioled. *Cymes* leafy, many-flowered. *Flowers* $\frac{1}{4}$–$\frac{1}{2}$ in. diam., inclined or nodding, pure white. *Calyx* very small. *Petals* oblong, obtuse. *Pedicel* of ovary variable in length. *Fruit* $\frac{1}{4}$–$\frac{1}{3}$ in. diam.

3. PEGANUM, Linn.

Branching glabrous or pubescent perennial-rooted herbs. *Leaves* alternate, entire or multifid, not glandular; stipules setaceous. *Flowers* solitary, in subterminal leaf-opposed peduncles, white. *Sepals* 4–5, often foliaceous and pinnatifid, persistent. *Petals* 4–5, subequal, imbricate. *Stamens* 12–15, inserted at the base of the disk, some antherless; filaments dilated below; anthers linear. *Ovary* globose, deeply 2–3-lobed; styles basal, twisted, 2–3-keeled above, the keels stigmatose; ovules many in each cell, inserted in the inner angle. *Fruit* globose, 3–4-celled, dry and 3-valved or fleshy and indehiscent, cells many-seeded. *Seeds* angled, testa spongy, rough, albumen fleshy; embryo curved.—DISTRIB. Species 4, natives of the Mediterranean, W. Asia, and Mexico.

This genus is perhaps better placed in *Zygophylleæ.*

1. **P. Harmala,** *Linn.;* glabrous, stem dichotomously and corymbosely branched, leaves multifid, segments linear acute, petals elliptic-oblong, fruit capsular. *Wall. Cat.* 1204; *Boiss. Fl. Orient.* i. 917; *W. & A. Prodr.* 146; *Dalz. & Gibs. Bomb. Fl.* 45.

North-West India, from SINDH, the PANJAB, and the KASHMIR plain to DELHI and AGRA; the WESTERN DECCAN.—DISTRIB. Soongaria, Arabia, N. Africa, and westward to Hungary and Spain.

A bush, 1–3 ft. high, much branched and densely foliaged. *Stem* stout, flexuous.

Leaves 2–3 in., green, pinnatifidly cut into linear very narrow acute spreading lobes. *Flowers* ½–¾ in. diam., solitary in the axils of the branches, sessile or pedicelled. *Calyx-lobes* very narrow, much exceeding the corolla, persistent. *Capsule* globose, ⅓ in. diam., and less.

4. **DICTAMNUS,** Linn.

A strong-smelling herb, shrubby below, clothed with pustular glands. *Leaves* alternate, unequally pinnate; leaflets opposite, ovate or ovate-lanceolate, serrulate. *Flowers* large, white or rose-coloured, in terminal racemes, pedicels bracteate. *Calyx* 5-partite, deciduous. *Petals* 5, 4 upper in pairs ascending, lower declinate. *Stamens* 10, inserted at the base of a thick annular disk, filaments long slender somewhat thickened and very glandular below the slender tip; anthers subglobose. *Ovary* shortly stipitate, deeply 5-lobed, 5-celled, hispid; style filiform, declinate, stigma terminal; ovules 3–4 in each cell, inserted on the ventral suture. *Fruit* of 5 compressed broad truncate long-beaked elastically 2-valved 2–3-seeded hispid carpels; endocarp horny, separable. *Seeds* subglobose, testa thin black shining, albumen fleshy; cotyledons thick, radicle short.

1. **D. albus,** *Linn.* D. Fraxinella, *Pers.; DC. Prodr.* i. 712; *Boiss. Fl. Orient.* i. 920. D. himalayanus, *Royle Ill.* 156, t. 29.

TEMPERATE WESTERN HIMALAYA, from Kashmir to Kunawur (and according to Royle, Junnotie in Garwhal), alt. 6–8000 ft.—DISTRIB. Japan, Siberia, Dahuria, and westward to France and Spain.

Stem stout but not woody, branched. *Leaves* 1 ft. and upwards; petiole very stout, angular, margined; leaflets 2–3½ in., sessile, dark green, base wedge-shaped, nerves slender. *Racemes* 1 ft. and upwards, stout, strict, erect. *Flowers* 1½ in. long, erect; pedicels 1–3 in., glandular, bracteate at the base and bracteolate usually above the middle. *Sepals* small, lanceolate. *Petals* elliptic-lanceolate, glandular on the back. *Stamens* equalling the petals. *Capsule* 1 in. diam.

5. **EVODIA,** Forst.

Trees or shrubs, unarmed. *Leaves* opposite, simple or 1–3-foliolate or imparipinnate, quite entire. *Flowers* small, in panicled axillary cymes, unisexual. *Sepals* 4–5, imbricate. *Petals* 4–5, sessile, valvate or slightly imbricate. *Stamens* 4–5, inserted at the base of the disk, filaments subulate; anthers oblong. *Ovary* deeply 4-lobed, 4-celled; style basilar, stigma 4-lobed, ovules 2 in each cell, collateral or superposed. *Fruit* of 4 coriaceous 3-valved 1-seeded cocci, endocarp horny elastically separable 2-lobed. *Seeds* oblong, testa bony or crustaceous shining, hilum linear, albumen fleshy; embryo straight, cotyledons ovate.—DISTRIB. About 22 species, natives of tropical Asia, the Pacific, the E. African Islands, and Australia.

* *Leaves 3-foliolate.*

1. **E. Roxburghiana,** *Benth. Fl. Hongk.* 59; leaves quite glabrous throughout, cymes very broad bracteate finely pubescent, flowers densely crowded, filaments glabrous, ovary densely pubescent. E. triphylla, *Bedd. Flor. Sylvat; Anal. Gen.* xli. t. vi. f. 2. E. Marambong, *Miquel Ann. Mus. Bot.* iii. 244. Fagara triphylla, *Roxb. Fl. Ind.* i. 416 (*? of Linn.*). F. Lunur-ankenda, *Gærtn. Carp.* i. 334, t. 68, f. 9. Xanthoxylon triphyllum, *Wight Ic.* t. 204; *Ill.* i. 169; *Grah. Cat. Bomb. Pl.* 36; *Dalz. & Gibs. Bomb. Flor.* 45. X. Roxburghianum, *Cham. in Linnæa* v. 58. X. zeylanicum, *DC. Prodr.* i. 728. X. nilagiricum, *Miquel Herb. Hohenack.*

X. Marambong, *Miq. Fl. Ind. Bat. Suppl.* 533. Schmidelia integerrima, *Wall. Cat.* 8065.

KHASIA MTS., alt. 4000 ft., *H. f. & T.* Throughout the Mountains of the WESTERN PENINSULA; in the EASTERN PENINSULA, from Tenasserim to Malaya and Penang, &c., CEYLON.—DISTRIB. Sumatra, Java.

A small tree with soft wood; branches opposite. *Leaves* usually large, spreading; petiole 2–5 in. terete; leaflets 2–5 in., very shortly petioled, obovate, oblong or oblanceolate, tip rounded or acuminate or apiculate, nerves almost horizontal very slender not at all prominent, costa perfectly glabrous on both surfaces. *Cymes* very variable, length and breadth of peduncle, more or less finely pubescent; branches opposite and alternate, bracts minute. *Flowers* usually densely crowded, $\frac{1}{10}$–$\frac{1}{8}$ in. diam., yellow-green, very shortly pedicelled. *Calyx* minute. *Petals* slightly imbricate. *Capsules* usually 2, about the size of a pepper-corn, coriaceous, rugose. *Seed* splendent, blue-black.

There is some doubt as to the name which this species should bear, consequent upon the obscurity of *Evodia triphylla*, DC., founded on the Philippine Islands *Fagara triphylla* of Lamk. (*Evodia Lamarckiana*, Benth. Flor. Hongk. 59). Lamarck (Dict. ii. 447) identifies his Philippine Isld. plant with Rumph's *Ampacus angustifolius* (Herb. Amb. ii. 88, t. 62), with which also Bentham's Hongkong specimens agree. Roxburgh, on the other hand, identifies a Penang plant, cultivated in the Calcutta Gardens, with Rumph's *Ampacus angustifolius*, and describes its capsules as the size of a field-bean. This character of capsule does not agree with any Indian species known to me. Roxburgh's characters agree in all but this, with a common Malay plant. As Wight refers an identical Nilghiri plant to Roxburgh's, I have preferred to retain for it the name *Roxburghiana*, given to it by Chamisso, to distinguish it from the true *triphylla* of Lamarck, which has very small few-flowered cymes and smaller capsules. Bentham (l.c.) observes that Lamarck's plant is a native of India, and quotes Wight's Icones; but this is a mistake, for Wight's figure represents a poor specimen of this, which is a common Nilghiri plant. Wight gives Jussieu as the authority for *X. triphyllum*, both in his "Icones" and "Illustrations;" but this is an error. Wallich's *Schmidelia integerrima* is clearly a very large-leaved form from Penang; it has neither flower nor fruit; the terminal leaflet is 12 by 5 in.

2. **E. triphylla,** *DC. Prodr.* i. 724; leaves quite glabrous, nerves slender, cymes small hardly bracteate, branches and pedicels very slender finely pubescent, filaments glabrous, ovary hairy. E. Lamarckiana, *Benth. Fl. Hongk.* 59. E. gracilis, *Kurz in Journ. As. Soc. Beng.* 1871, ii. 48. Fagara triphylla, *Lamk. Dict.* ii. 447. Xanthoxylum Lamarckianum, *Cham. in Linnæa* v. 58. X. pteleæfolium, *Champ. in Kew Journ. Bot.* iii. 330. Lepta triphylla, *Lour. Fl. Cochin.* 82.

TENASSERIM, at Moolmein, alt. 6000 ft., *Parish;* north of Moulmein, *Helfer;* BIRMA, *Brandis.*—DISTRIB. Philippine Islds., Japan, China, Borneo.

This, though a very distinct-looking plant from *E. Roxburghiana*, is not easily characterized, except by comparison. It is smaller, more slender, with shortly-peduncled cymes, 1–3 in. long, hairy, more slender branches and pedicels, the flowers are smaller and paler, and the capsules much smaller, about $\frac{1}{8}$ in. diam. The Tenasserim specimens have elliptic-lanceolate leaves, but in other countries they vary from obovate to elliptic-lanceolate. As in *E. Roxburghiana* the costa above is perfectly glabrous.

3. **E. robusta,** *Hook. f.*; leaflets elliptic obtuse or obtusely-acuminate shining, nerves very prominent beneath, costa glabrous above puberulous beneath, cymes broad brachiate their branches very robust.

PENANG, *Phillips;* SINCAPORE, *Maingay* (278 *Kew Distrib.*).

A much more robust plant than *E. triphylla*. *Branchlets* compressed, as thick as a swan's quill, hoary. *Petiole* 4 in., terete, as thick as a crow-quill; leaflets 6–8 in., terminal subobovate, lateral elliptic, coriaceous, midrib and arching nerves very strong indeed. *Cymes* 5 in. diam. and upwards. *Flowers* and fruit as in *Roxburghiana*, of which this may be a variety; but it differs remarkably from the Sincapore and Malacca specimens of that plant, and is the only trifoliolate species known to me with shining upper surfaces to the leaves.—This differs from Miquel's description of the Sumatran *Zanthoxylon Euneuron* (Fl. Ind. Bat. Suppl. 532) in its glabrous capsules, in the leaves not pale and silvery beneath, and in the fruiting cyme not being pyramidal.

4. **E. latifolia,** *DC. Prodr.* i. 724; branchlets petioles leaves beneath and midrib above tomentose, leaflets large, nerves strong, cymes pubescent and brachiate or pyramidal, capsules glabrous. *Miq. Fl. Ind. Bat.* i. pt. 2, 672; *Ann. Mus. Bot.* iii. 244. Zanthoxylum Rumphianum, *Cham. in Linnæa* v. 58.

MALACCA, *Griffith;* (*Kew Distrib.* 1176); *Maingay* (*Kew Distrib.* 277).—DISTRIB. Malayan Archipelago.

Branchlets as thick as the little finger, obtusely 4-angled. *Petiole* 4–6 in., as thick as a goosequill or less; leaflets 6–10 in. broad, elliptic or elliptic-lanceolate, glabrous above except the costa, finely pubescent beneath. *Cymes* more pyramidal than in *I. Roxburghiana;* flowers and capsules quite the same.

VAR. ? branches more slender, leaves more membranous puberulous on the costa above and nerves beneath only not on either surface.—Malacca, *Griffith, Maingay.* This resembles Miquel's description and plate of *E. accedens* (Ann. Mus. Bot. iii. 242, t. 6), except in the much smaller flowers, which wholly resemble those of *E. latifolia.*

5. **E. glabra,** *Blume Bijd.* 245; glabrous, leaflets large 5–7 in. dark green above paler beneath with very strong nerves, cymes large brachiate glabrous. *Miq. Flor. Ind. Bat.* i. pt. 2, 672; *Ann. Mus. Bot.* iii. 243.

PENANG, *Phillips.*—DISTRIB. Java.

This closely resembles *E. robusta,* but the leaflets are not shining above, are of a dark green colour when dry, and are sometimes suddenly acuminate. My specimens, which are in ♂ flower only, have branchlets as thick as the little finger and pyramidal bracteate densely-flowered cymes; they precisely resemble a flowerless specimen of *E. glabra* from the Leyden Herbarium, which is, I presume, authentic, though the leaflets are abruptly acuminate, which is contrary to Miquel's description.

** *Leaves* 1- *rarely* 3-*foliolate.*

6. **E. viticina,** *Wall. Cat.* 1219; quite glabrous, leaves 1–3-foliolate, petiole acutely margined, leaflets lanceolate acuminate, cymes small usually shorter than the petiole few-flowered. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 64.

TENASSERIM; at Tavoy, *Gomez, Helfer.*

Branches slender, alternate, 2-edged, and whole plant dull green when dried. *Petiole* $\frac{1}{4}$–$1\frac{1}{2}$ in., with 2 acute edges bounding a median groove in front; leaflets $1\frac{1}{2}$–$4\frac{1}{2}$ in., pale beneath; nerves very slender, horizontal. *Cymes* 6–10-flowered, erect, almost glabrous; peduncle glabrous, angled. *Flowers* minute, fascicled, 4-merous; pedicel very short, slender. *Fruit* $\frac{1}{6}$ in. diam., of 4 nearly smooth rather compressed carpels.

7. **E. pedunculosa,** *Hook. f.*; leaves 1-foliolate, petiole $\frac{1}{2}$-cylindric, leaflet obovate abruptly narrowed at the obtuse point quite glabrous, cymes trichotomous pubescent terminating long slender peduncles.

SINGAPORE, *Lobb.*

I have seen but one specimen of this very distinct plant. *Branches* smooth, cylindric, glabrous. *Leaves* 4–5 in.; petiole rather stout, $\frac{1}{2}$–1 in., edges acute, not thickened at the top; leaflet coriaceous, quite entire, cuneate at the base, copiously minutely punctate, costa stout, nerves many slender spreading. *Peduncles* in opposite axils, stout, 1–4 in., pubescent towards the top where they branch into small trichotomous pubescent cymes. *Flowers* (♂ buds only) shortly pedicelled, bracts minute, buds $\frac{1}{12}$ in. diam. *Sepals* rounded, acute. *Petals* broad-ovate, acute, valvate, glabrous. *Stamens* 4, filaments short; anthers broad, acute. *Disk* tumid. *Ovaries* 4, imperfect, immersed in the disk.

*** *Leaves pinnate.*

8. **E. fraxinifolia,** *Hook. f.;* leaves quite glabrous throughout, leaflets 3–5-pairs, cymes broad brachiate pubescent, branches stout, flowers 4–5-merous, fruit glabrous. Tetradium trichotomum, *Lour. Fl. Coch.* 91; *DC. Prodr.* ii. 88. Rhus fraxinifolium, *Don Prodr.* 248. Philagonia fraxinifolia, *Hook. Ic. Pl.* t. 710; *Wall. Cat.* 8521? P. sambucina, *Blume Bijd.* 250. P. procera, *DC. Prodr.* ii. 90.

SUBTROPICAL HIMALAYA from Nipal to Sikkim, alt. 4–7000 ft.; KHASIA MTS., alt. 3–5000 ft.—DISTRIB. Java? Cochinchina.

A small much branched densely leafy tree, smelling strongly of Caraway when bruised. *Branchlets* thick, terete. *Leaves* 8–12 in., spreading, bright green; petiole cylindric; leaflets 4–9 in., shortly petioled, oblong or oblong-lanceolate, acuminate, straight or falcate, quite entire or crenulate, base rounded often oblique, nerves spreading, slender, terminal leaflet often long-petioled. *Cymes* on short stout compressed peduncles, axillary and terminal, clothed with fine close-set pubescence; bracts minute. *Flowers* shortly pedicelled, white, ♂ nearly ½ in. diam. *Sepals* small, obtuse. *Petals* imbricate, pubescent within. *Stamens* exceeding the petals, filaments somewhat hairy; anthers broad. *Ovary* glabrous; style short, stigma capitate. *Fruit* ½ in. diam., red; carpels not separating to the base, very coriaceous. *Seed* broadly elliptic, slightly compressed; testa dark brown, shining.—I can hardly doubt this being the *Philagonia sambucina* of Blume (*P. procera,* DC., published in the same year); but having seen no Java specimen I retain the name of *fraxinifolia.* It is the plant alluded to under *Evodia* in the "Genera Plantarum" as *E. Roxburghiana.*

9. **E. meliæfolia,** *Benth. Fl. Hongk.* 58; petioles pilose, leaflets 3–5 pairs glabrous, cymes broad brachiate pilose-pubescent, branches very slender, flowers 4–5-merous. E. glauca, *Miq. Ann. Mus. Bot.* iii. 23. Boymia glabrifolia, *Champ. in Hook. Kew Journ. Bot.* iii. 330. Megabotrya meliæfolia, *Hance in Walp. Ann.* ii. 259.

ASSAM, *Masters* (*in Herb. Griffith*).

A much more slender plant than *E. fraxinifolia,* with spreading soft hairs on the rachis of the leaf and on the more slender partial petioles, very slender spreading branches of the cyme, which is 8 inches broad, fewer sparser flowers, the ♂ ¼ in. diam., shorter more slender filaments, and more oblong anthers. The leaflets are 3–4 in., more oblique at the base, and usually more acuminate.

10. **E. rutæcarpa,** *Hook. f. & Thoms. Herb. Ind. Or.;* clothed throughout with soft velvety pubescence, cymes brachiate, branches very stout, fruit pustular. Boymia rutæcarpa, *Juss. according to Sieb. & Zucc. Fl. Japon.* i. 50, t. 21.

Inner valleys of the Temperate region of the SIKKIM HIMALAYA, alt. 7–10,000 ft., *J. D. H.*—DISTRIB. Japan.

A small densely-foliaged green tree, inodorous. *Leaves* 1–1½ ft.; petiole terete, stout; leaflets about 5 pair, subsessile, oblong-acute, usually rounded and oblique at the base, margin quite entire, under surface woolly, nerves faint. *Cymes* 3–4 in. diam., terminal; peduncles very short, stout and as well as the pedicels and calyx tomentose. *Flower* about ⅓ in. diam. *Petals* nearly glabrous externally, pubescent within. *Stamens* not much exceeding the petals, filaments hairy; anthers very large, ovate, 2-lobed at the base. *Fruit* ½ in diam.; carpels 4, opening at the apex.

6. **TETRACTOMIA,** Hook. f.

Trees or shrubs. *Leaves* opposite, petioled, 1-foliolate, coriaceous, quite entire, punctate. *Flowers* small, in axillary branched cymes. *Calyx* small, 4-partite. *Petals* 4, triangular-ovate, acute, persistent, valvate.

Disk broad, glandular, flattish or pulvinate, obtusely 4-angled. *Stamens* 8, 4 perfect alternate with the petals, 4 smaller with imperfect anthers (or 0) opposite the petals and partially adnate to them at the base; filaments subulate, flattened at the base; anthers 2-lobed, dorsifixed. *Ovary* immersed in the centre of the disk, 4-celled, with 4 free projecting lobes; styles 4, free at the base, connate above, stigma capitate obscurely 4-lobed; ovules 2, collateral in each cell. *Fruit* of 4 coriaceous laterally compressed oblong 2-seeded carpels, splitting ventrally, the horny endocarp partially separating. *Seeds* inserted towards the base of the carpels (nucleus small with a large oblong obtuse membranous wing, embryo unknown).—DISTRIB. Three species, natives of the Malayan Peninsula and Borneo.

A very singular genus, which I find in no Indian Herbarium but Maingay's, who gathered both species in 1867-8, and describes *H. majus* in his Mss. as a *Diosmea*, no doubt because of the staminodes, and the leaves as alternate, in which he is certainly mistaken. One of these two is, however, the *Melicope tetrandra* of Roxburgh, from Penang. It is nearly allied to *Evodia*, differing in the staminodes, valvate petals and seeds. A third species (*H. Beccarii*, Hook. f.) from Borneo was discovered by Dr. Beccari at Sarawak (No. 1880), it has obovate leaves and small trichotomous glabrous cymes. I have described the seeds as I found them in *H. majus* (which are imperfect), but Roxburgh describes them in his *Melicope tetrandra* as oblong and immersed in a yellow fleshy aril. I have no seeds of this species, but the structure of the capsule is precisely as in *H. majus*.

1. **T. majus,** *Hook. f.;* leaflets 8 in. obovate rounded at the tip, cymes glabrous or nearly so.

MALACCA, *Maingay* (*Kew distrib.* 290).

A tree; branchlets stout, woody, as thick as the finger, covered with rough brown bark. *Leaves* apparently crowded on the branchlets; petiole 2–2½ in., stout, terete, slightly swollen at the base and apex; leaflets very coriaceous, quite entire, narrowed at the base, pale when dry with obscure darker spots, nerves numerous slender spreading, smooth above, beneath with minute prominent gland-dots crowned with microscopic hairs; nervules reticulate, obscure, most visible on the upper surface (*Maingay*). *Cymes* 4–6 in. diam., opposite, glabrous or minutely pubescent, branches stout spreading alternate, branchlets opposite; bracts minute, persistent. *Flowers* ¼ in. diam., pedicelled, ebracteolate, glabrous. *Filaments* exceeding the petals and style. *Ripe carpels* unequally ½ in. long, obtusely keeled at the back. *Seeds* nearly as long as the carpel; nucleus basal, oblique, very much smaller than the oblong wing.

2. **T. Roxburghii,** *Hook. f.;* leaflets 3–5 in. elliptic or cuneate-obovate obtusely acuminate, cymes pubescent. Melicope tetrandra, *Roxb. Fl. Ind.* ii. 257.

PENANG, *Roxb.;* SINGAPORE, *Maingay* (*Kew distrib.* 278, 2).

Differs from *H. majus* conspicuously in size, the branchlets not being thicker than a goose-quill, and the flowers ⅛ in. diam., and ripe carpels ¼ in. long. In texture and nervation the leaflets are identical; the cymes of this are laxly clothed with a furfuraceous pubescence.

7. MELICOPE, Forst.

Shrubs. *Leaves* opposite (in the Indian species) 1–3-foliolate, pellucid-punctate. *Flowers* small, in axillary cymes or panicles. *Calyx* 4-lobed or 4-partite. *Petals* 4, sessile, spreading, valvate or imbricate. *Disk* large, entire or 8-lobed or obsolete. *Stamens* 8, inserted at the base of the disk, those opposite the petals shorter, filaments subulate or flattened; anthers oblong or cordate. *Ovary* 4-celled, deeply 4-lobed; style basilar or styles 4, subterminal, more or less combined, stigma capitate 4-lobed; ovules 2 in each cell, collateral or superposed. *Fruit* of 4 free spreading coriaceous carpels dehiscing on the inner face; endocarp more or less separating. *Seeds* oblong, funicle sometimes elongate, testa black brittle shining, albumen fleshy and oily; embryo with large oblong cotyledons and a short superior radicle.—DISTRIB. Chiefly Polynesian; species about 15.

1. **M. indica,** *Wight Ic.* t. 1051; glabrous, leaves 1-foliolate, leaflets elliptic or obovate acute, flowers 3–5 terminating long slender decurved peduncles. *Bedd. Flor. Sylvat. Anal. Gen.* xl. t. vi. f. 1.

NILGHIRI MTS., in woods near the Avalanches, *Wight, Gardner.*

A shrub or small tree; branches slender. *Leaves* glabrous; petiole ½–1½ in., terete; leaflet 3–4 in., glabrous, shining, narrowed towards the base, nerves very slender. *Peduncles* 2–4 in., slender, often 3-flowered. *Flowers* ⅓ in. diam., on short stout pubescent pedicels. *Calyx* divided nearly to the base into 4 orbicular coriaceous obtuse lobes. *Petals* valvate, ovate, acute, glabrous, thick, longer than the stamens. *Disk* obsolete. *Ovary-lobes* villous, free at the apex; styles free below; ovules subcollateral. *Ripe carpels* 4, ⅓ in. long, turgid, apiculate, 1-seeded, veined. *Seed* oblong.

2. **M.? Helferi,** *Hook. f.*; quite glabrous, leaves 1-foliolate, petiole short stout, leaflet obovate-lanceolate obtuse, panicle rather longer than the petiole few-flowered, petals valvate.

TENASSERIM or ANDAMAN ISLDS., *Helfer.*

Diœcious? *Branches* rather stout, bark wrinkled; whole plant yellowish when dried. *Petiole* ¼–1 in., not acutely margined; leaflet 4–8 in., membranous, nerves horizontal, very slender. *Cymes* 1–3 in., panicled, suberect; peduncle rather stout, quite glabrous; branches ¼–½ in., few. *Flowers* (♂) small, fascicled; pedicels short, stout. *Petals* valvate, longer than the stamens. *Disk* 8-lobed. *Fruit* not seen.

8. **ZANTHOXYLUM,** Linn.

Shrubs or trees, often armed with stout prickles. *Leaves* alternate, 3-foliolate or unequally pinnate; leaflets opposite or alternate, entire or crenate, often oblique, punctate. *Flowers* small, in axillary or terminal peduncled broad or narrow cymes, white, pink, or greenish, often unisexual. *Calyx* 3–8-fid, rarely 0. *Petals* 3–5, rarely 0, imbricate or induplicate-valvate. *Disk* small or obscure. *Stamens* 3–5, hypogynous or reduced to scales in the ♀. *Ovary* rudimentary in the ♂, in the ♀ of 1–5 oblique 1-celled carpels; styles sublateral, free or connate above, stigma capitate; ovules 2 in each cell, usually collateral. *Fruit* of 1–5 globose coriaceous or fleshy 1-seeded carpels, dehiscing ventrally, endocarp horny, separating or not. *Seed* oblong and compressed or globose, often hanging out of the carpel, hilum broad, testa bony or crustaceous blue or black shining, albumen fleshy; embryo axile, straight or curved, cotyledons flat, radicle very short.—DISTRIB. About 80 species, all tropical and subtropical.

SECT. 1. *Cymes* axillary, or axillary and terminal; branches alternate.

* *Leaves 3-foliolate, petiole not winged, flowers polypetalous.*

1. **Z. ovalifolium,** *Wt. Ill.* i. 169; quite glabrous, unarmed or with short straight prickles, leaflets elliptic-oblong or obovate crenulate tip obtuse emarginate. *Bedd. Flor. Sylvat. Anal. Gen.* xlii. t. vi. f. 3; *Wall. Cat.* 7469. Z. lucidum, *Wall. Cat.* 1212. Toddalia mitis, *Miq. in Herb. Hohenack.* 466. Limonia leptostachya, *Jack according to Herb. Griffith.*

WESTERN PENINSULA, in Canara, Kurg and the Nilghiri Mts., and near Madras; KHASIA MTS.; ASSAM and MISHMI MTS.; SINGAPORE, *Wallich.*

A shrub? *Leaflets* 3–4 in., coriaceous, subsessile, petioles not armed. *Cymes* in slender panicles, quite glabrous. *Flowers* ⅛–⅙ in. diam., 4–5-merous. *Petals* valvate. *Ripe carpels* solitary, the size of a pea, smooth.—Wight makes 2 species of this, which I cannot distinguish except as varieties. The Khasian and Assam specimens have rather longer leaves than the Madras ones.

VAR. 1. *ovalifolium;* unarmed. Z. ovalifolium, *Wight, l.c.*

VAR. 2. *sepiarium;* armed with short straight prickles. Z. sepiarium, *Wt. Ill.* i. 169.

** *Leaves* 5–∞- *foliolate, petiole winged, flowers apetalous, wood with a broad septate pith.*

2. **Z. alatum,** *Roxb. Fl. Ind.* iii. 768; leaflets 2–6 pairs lanceolate glabrous beneath, petiole and rachis usually broadly winged, nerves very indistinct, flowers in sparse panicles 2–6 inches long glabrous or pubescent. *Wall. Cat.* 1209 *in part; Brandis For. Flor.* 47; *Bedd. Flor. Sylvat. Anal. Gen.* xlii. Z. hostile, *Wall. Cat.* 1210, *in part.*

Hot valleys of the SUBTROPICAL HIMALAYA, ascending to 6000 ft. from Jamu to Bhotan; KHASIA MTS., alt. 2–3000 ft.

A shrub or small tree, with dense foliage and pungent aromatic taste and smell; prickles often vertically flattened on the trunk and branches, the older with a corky base. *Leaves* 1½–9 in. (in Khasia specimen); petiole glabrous, narrowly winged, with 2 stipular prickles at the base; leaflets ¾–4 in., narrow, usually elliptic-lanceolate, rarely ovate, obtusely acuminate. *Panicles* loose, sparingly branched. *Flowers* ⅛–⅙ in. diam. *Calyx* 6–8-lobed, lobes subacute. *Stamens* 6–8. *Ripe carpels* ⅙–⅕ in. diam., usually solitary, laxly panicled, broadly ovoid, pale red, tubercled.—Young leaflets have often the costa prickly beneath, and usually few large scattered glands. The wood is hard and used for tooth cleaning, and the carpels as a condiment.

3. **Z. acanthopodium,** *DC. Prodr.* ii. 727; branchlets glabrous or tomentose, leaflets 2–6-pairs lanceolate, nerves distinct glabrous or more or less pubescent beneath, petiole and rachis narrowly winged, cymes very short dense ½–1 in. long pubescent. Z. hostile, *Wall. Cat.* 1210, *and* Z. alatum, *Wall. Cat.* 1209, *in part.*

Hot valleys of the SUBTROPICAL HIMALAYA, from Kumaon to Sikkim, ascending to 7000 ft.; KHASIA MTS., alt. 4–6000 ft.

Very similar indeed to *Z. alatum*, and possibly a variety of that plant, but the leaflets have never the large scattered glands, and are often very pubescent beneath, the nerves are much stronger, and the inflorescence is remarkably different, the ripe carpels (⅙ in. diam.) forming dense sessile and almost globose clusters on the branches below the leaves.—The *Z. planispinum*, Sieb. and Zucc., of Japan, is probably another variety, with fewer glabrous leaflets, faint nerves, and glabrous inflorescence; it is intermediate between this and *Z. alatum*, to which it is most nearly allied, but wants the large glands. Wallich in his catalogue quotes *Z. acanthopodium*, DC., as a synonym of *Z. alatum*, Roxb., and the ticket is attached to a specimen with very short cymes and crowded points, and with leaves pubescent beneath. I therefore retain De Candolle's name for this plant, which is quite distinct from Roxburgh's *Z. alatum.*

VAR. *Timbor;* branches clothed with dense rusty (when dry) tomentum. Z.? Timbor, *Wall. Cat.* 7116.—Chainpur hills, *Hamilton* (? Chayanpoor hills in Behar, 40 miles S.E. of Benares).

*** *Leaves* 5–∞-*foliolate, petiole not winged, flowers polypetalous.*

4. **Z. tomentellum,** *Hook. f.;* sparingly prickly, branches petioles and cymes velvety, leaflets alternate 6–8 pairs quite entire velvety beneath, cymes axillary.

EASTERN SUBTROPICAL HIMALAYA; Bhotan, *Griffith;* Sikkim, at Choongtam, alt. 5000 ft., *J. D. H.*

A small erect tree, 30 ft., with horizontal branches; branchlets terete, stout, woody; prickles scattered, short, recurved. *Leaves* 8–12 in.; petiole terete, with scattered hooked prickles on the under-side; leaflets 2–3 in., shortly petioled, oblong or elliptic, subacute or obtusely acuminate, coriaceous, glossy above, base subequal, nerves distinct. *Cymes* 2–4 in., sparingly branched, densely velvety, branches few short and rachis stout; bracts and bracteoles caducous. *Flowers* (♀ only seen) small, clustered; about $\frac{1}{8}$ in. diam. *Sepals* 4, pubescent. *Petals* glabrous. *Carpels* 4, glabrous. *Carpels* (hardly ripe) $\frac{1}{6}$ in. long, 4, compressed, beaked.

5. **Z. oxyphyllum,** *Edgew. in Trans. Linn. Soc.* xx. 42; glabrous, prickles hooked, leaflets alternate and opposite 3–10 pairs, young crenate, cymes terminal and axillary quite glabrous or slightly pubescent, flowers large. —Zanthoxylon violaceum, *Wall. Cat.* 1213.

TEMPERATE and SUBTROPICAL HIMALAYA, from Garwhal, alt. 4–8000 ft., to Sikkim, alt. 6–9000 ft., and BHOTAN; KHASIA MTS., alt. 4–6000 ft.

A shrub, clothed with hooked prickles. *Leaves* very variable in size, 4–12 in.; petiole arched, usually very prickly along the back; leaflets in young specimens ovate-lanceolate, very long-acuminate, crenate-serrate, pale, nerves very distinct beneath, in older ones more elliptic or oblong, 2–2½ in. long in Kumaon specimens, upwards of 4 in. in some Sikkim ones, coriaceous, shining above. *Cymes* much branched many-flowered. *Flowers* the largest of the Indian species, $\frac{1}{4}$–$\frac{1}{3}$ in. diam., umbellate, on the branches of the cyme; pedicels slender, longer than the petals. *Sepals* 4, small, obtuse. *Petals* 4, obtuse, imbricate *Ripe carpels* 2–4, the size of a pea, tubercled, hardly beaked. *Seed* black.

6. **Z. khasianum,** *Hook. f.*; branches petioles and inflorescence pubescent, leaflets 8–10 pairs alternate rarely opposite small ovate with an obliquely curved narrowed obtuse apex quite glabrous, cymes axillary and terminal.

KHASIA MTS.; at Myrung, alt. 4–6000 ft., *J. D. H. & T. T.*

A small very fragrant climbing straggling bush. *Branches* very slender, sparingly prickly. *Leaves* 1 ft. long, arched; petiole more or less pubescent, usually copiously prickly underneath; leaflets 1–1¾ in., straight or oblique, coriaceous, shining above, fully $\frac{1}{3}$ of the blade usually occupied by the contracted apex; partial petioles $\frac{1}{10}$–$\frac{1}{4}$ in. *Cymes* (♀ only seen) 2 in., panicled, spreading, very pubescent. *Ripe carpels* 1–3, about $\frac{1}{6}$ in. diam., globose, not beaked. *Seeds* globose, black.—I have not ventured to unite this with the very similar Chinese Z. cuspidatum, *Champ.* (*in Kew Journ. Bot.* iii. 329), though this agrees entirely in habit, the curious form of the alternate petioled small leaflets, and in the paniculate cyme and fruit; it differs in being very pubescent on the branches petiole and rachis of the leaf and cyme, and in the small less coriaceous and less shining leaves, that do not blacken in drying.

7. **Z. Hamiltonianum,** *Wall. Cat.* 7117; prickles few short, branches and petioles glabrous or more or less pubescent or velvety, leaflets 4–7 in., 2–3 pairs, opposite glossy oblong not sinuate, cymes axillary tomentose or glabrous.

ASSAM, *Jenkins;* Sudyah and BIRMA, *Griffith;* Borybari, *Hamilton* (Feb. 1809).

Probably a large scandent shrub; branches stout, woody, prickles crooked. *Leaves* 6–8 in.; petiole terete, stout, very prickly; leaflets subsessile, suddenly narrowed into a broad notched apex, base rounded, glossy on both surfaces, glabrous or pubescent beneath, with many subparallel prominent arching nerves. *Cymes* 3–4 in., panicled, very slender. *Flowers* $\frac{1}{10}$ in. diam., shortly pedicelled. *Petals* 4–5, valvate or slightly imbricate.—Perhaps a form of *Z. tetraspermum.*

VAR. *tomentosum;* branches, petioles, and inflorescence very tomentose.—Assam, *Jenkins.*

8. **Z. tetraspermum,** *W. & A. Prodr.* 148; very prickly, glabrous except the velvety cymes, leaflets 3–5 in. opposite 2–3 pairs large elliptic or

oblong very glossy coriaceous many-nerved margin waved and sinuate-toothed, cymes axillary and terminal. *Thwaites Enum.* 69; *Beddome Flor. Sylvat. Anal. Gen.* xlii.

WESTERN PENINSULA; Kurg and the Nilghiri Mts., CEYLON, alt. 3–5000 ft., *Walker.*

A stout climbing shrub; prickles short, hooked. *Leaves* 4–7 in., glabrous; petiole stout, straight, very prickly; leaflets subsessile, suddenly contracted to a rather long obtuse notched tip, shining above and sinuate-toothed, especially in the Ceylon specimens, coriaceous, nerves numerous spreading. *Panicles* 2–3 in., axillary and terminal, short, or rather large and spreading, when terminal densely tomentose, branches alternate. *Flowers* small, $\frac{1}{12}$–$\frac{1}{8}$ in. diam. *Petals* 4, acute, valvate. *Ripe carpels* 2–4, $\frac{1}{5}$ in. diam., globose.—Ceylon specimens have the brilliantly glossy leaves almost black when dry and far more sinuate-toothed than the Kurg ones, which show a passage to *Z. Hamiltonianum*, which has a very similar tip to the leaf.

SECT. 2. *Cymes* terminal; branches opposite. *Flowers* polypetalous. *Leaves* 5–∞-foliolate; petiole not winged. *Wood* with a broad septate pith.

9. **Z. Rhetsa,** *DC. Prodr.* i. 728; armed except the petioles and rarely the cymes with short prickles, leaflets 8–20 pairs very oblique quite entire glabrous, cymes terminal very large glabrous. *W. & A. Prodr.* 148; *Grah. Cat. Bomb. Pl.* 36; *Dalz. & Gibs. Bomb. Fl.* 45; *Thwaites Enum.* 69; *Bedd. Flor. Sylvat. Anal. Gen.* xli. Z. oblongum, *Wall. Cat.* 1218. Fagara Rhetsa, *Roxb. Fl. Ind.* i. 417. ? F. Budrunga, *Roxb. Fl. Ind.* i. 417, *not of Wallich.*—*Rheede Hort. Mal.* v. t. 34.

WESTERN PENINSULA, from Coromandel and the Concan southward; TAVOY, *Gomez.*

A tree with corky bark and spreading leafy branches, prickles straight or incurved, the old ones with a solid conic base. *Leaves* 1–1½ ft., clustered at the ends of the branches, equally or unequally pinnate; petiole unarmed; leaflets opposite, 3–5 in., with short partial petioles, recurved, ovate-oblong or lanceolate, caudate-acuminate, upper base rounded, lower very narrow and ending in the costa, nerves 10–12 on the upper half, 2 fewer on the lower. *Cymes* sometimes 1½ ft. broad; branches opposite, angled; bracts minute, caducous. *Flowers* $\frac{1}{6}$ in. diam., yellow, 4-merous. *Petals* valvate. *Ovary* glabrous. *Ripe carpels* solitary, the size of a pea, tubercled. *Seed* subglobose, blue-black.—The unripe carpels taste of orange-peel, the seeds like black pepper.—Thwaites introduces this into his Enumeratio, but says, in Herb. that he knows of but one tree, and that is in a garden.

10. **Z. Budrunga,** *Wall. Cat,* 1211; ?*of DC. Prodr.* i. 728; armed with short incurved prickles, leaflets 5–10 pairs glabrous broadly crenate with large glands in the sinus, base very oblique, cymes terminal very large glabrous. Z. crenatum, *Wall. Cat.* 1216. ? Fagara Budrunga, *Roxb. Fl. Ind.* i. 417.

TROPICAL HIMALAYA, Kumaon, *Blinkworth* (*in Herb. Wallich*); Forests of SILHET, the KHASIA MTS., CHITTAGONG, and MARTABAN.

Apparently a tree, easily recognised by the large glands at the crenatures of the leaflets.—I am not satisfied as to the name this plant should bear; the description is founded on Wallich's specimens from the Calcutta Garden, named *Z. Budrunga*, Roxb., and which should therefore be authentic, and which perfectly agree with those from Silhet, &c.; but Roxburgh describes in his "Flora Indica" (and figures in his drawings) the leaflets as few, narrow, and quite entire; and neither he nor Wallich (in Carey's edition of the "Flora Indica") makes allusion to the crenatures and glands. I find no plant corresponding to either Roxburgh's *Fagara Rhetsa* or *F. Budrunga* in any Silhet, Assam, or Bengal collection, and except in the fewer leaflets there is no differential character given by Roxburgh between these two supposed species, though in his drawings he figures the flowers of *Budrunga* as small, white, with stamens larger than the petals (probably a sexual character); and those of *Rhetsa* as larger, yellowish, with stamens shorter than the petals. On the other hand, there are plenty of Western Peninsula and Ceylon specimens of *Z. Rhetsa*, with a few leaves, as Roxburgh describes in *Z. Budrunga*, which leads me to suspect that Roxburgh may, by some mistake, have described a specimen of *Z. Rhetsa* with few leaflets for one of the Silhet *Z. Budrunga*. Should this not be so, and should his *Budrunga* prove really different from *Rhetsa*, Wallich's name of *Z. crenatum* must be given to the plant here described.

11. **Z. myriacanthum,** *Wall. Cat.* 1214; copiously armed except the petioles with short straight prickles, leaflets 4–8 pairs coriaceous not very oblique glabrous crenulate, cymes large terminal pubescent, carpels very small. Z. ?longifolium, *Wall. Cat.* 7115.

PENANG, *Porter;* MALACCA, *Maingay.*

A large tall tree (*Porter*). *Branches* stout, densely armed. *Leaves* 1–1½ ft.; petiole unarmed; leaflets 3–4 in., opposite, oblong or oblong-lanceolate, acute or subacuminate, crenatures minute and shallow, nerves spreading distinct beneath; partial petioles very short. *Cymes* long and broad, with much longer primary branches than *Z. Rhetsa*, which are terete and alternate, very pubescent, and bear a few scattered prickles. *Flowers* ⅕ in. diam., subsessile, 5-merous. *Calyx* 3- or more-, bracteate at the base. *Petals* 5, imbricate. *Ovaries* 3. *Ripe carpels* ⅛ in. diam., compressed, apiculate. *Seed* compressed, $\frac{1}{10}$ in. diam., not quite ripe.

DOUBTFUL, REJECTED, AND UNKNOWN SPECIES.

Z. ARMATUM, *Roxb. Cat. Hort. Beng.* 727; *DC. Prodr.* i. 727, is probably *Z. Rhetsa* or *Z. Budrunga.*

Z.? BAJARNANDIA, *Wall. Cat.* 7118; a very imperfect specimen, consisting of a broken unarmed petiole, 10 detached leaflets like those of *Z. oblongum*, but narrower, more finely acuminate, and with more numerous nerves and an even more oblique base, ripe carpels larger.—Assam, at Guralpara, *Hamilton.* Probably *Z. Rhetsa*, DC., but too imperfect for determination.

Z.? CONNAROIDES, *W. & A. Prodr.* 148, is a species of *Heynea.*

Z.? FINLAYSONIANUM, *Wall. Cat.* 7114; glabrous, branches as in *Z. spondiæfolium*, but the more numerous prickles are seated on a compressed woody conical base much broader than themselves, leaves 3 in., petiole very slender obscurely winged minutely armed, leaflets 8–10 alternate ⅓–½ in. rhomboid-ovate obtuse crenate, panicles axillary and terminal peduncled quite glabrous, flowers small subumbelled, petals 5.—Siam? *Herb. Finlayson.*

Z OBTUSIFOLIUM, *Poir. Suppl.* ii. 293; *DC. Prodr.* i. 727, is a doubtful native of India and probably not a *Zanthoxylum.*

Z. RHOIFOLIUM, *Lamk.; DC. l.c.* is not Indian, but the *Z. sorbifolium*, A. St. Hil., of America.

Z. SAPINDIFOLIUM, *Wall. Cat.* 1215, from Amherst. Of this there is no specimen in Wallich's Herbarium, but only a blank sheet with the ticket attached.

Z. SERRA, *Turcz. in Bull. Soc. Nat. Mosc.* 1858, i. 440, is *Saurauja nepalensis.*

Z. SPONDIÆFOLIUM, *Wall. Cat.* 1217; branches as thick as a goose-quill, bark rough, with very small conical prickles, leaves crowded at the end of the branch 4-5 in. glabrous, petiole slender unarmed, leaflets 5–8 subopposite 2–2½ in. elliptic-ovate acuminate quite entire, partial petiole $\frac{1}{10}$ in., flower-buds minute in short axillary clusters, petals 4, glabrous.—Amherst, *Wallich.*

Z. TRIFLORUM, *Turcz. l.c.* 1863, i. 597, described as having opposite leaves not pellucid dotted and 3-flowered peduncles in the upper axils, and which is a Nilghiri plant (Perottet, No. 154) is clearly not of this genus. It may be *Melicope indica*, W.

9. **TODDALIA,** Juss.

Usually subscandent or sarmentose prickly shrubs. *Leaves* alternate, 1-3-foliolate; leaflets sessile. *Flowers* small, in axillary or terminal cymes or panicles, unisexual. *Calyx* short, 2–5-lobed or -parted. *Petals* 2–5, imbricate or valvate. *Stamens* 2, 4, 5 (or 8 with the alternate imperfect), imperfect or 0 in the ♀ flower, inserted at the base of a short or long or inconspicuous disk. *Ovary* ovoid oblong or globose, rudimentary or 4-lobed in the ♂ flower, 2–7-(rarely 1-) celled; style short or 0, stigma capitate; ovules 2, superposed or collateral in each cell. *Fruit* subglobose, or lobed, coriaceous or fleshy, 2–7-celled; cells 1- rarely 2-seeded. *Seeds* angled, reniform, testa coriaceous, albumen fleshy; embryo curved, terete, cotyledons linear or oblong.—Distrib. About 8 species, natives of tropical and subtropical Asia, Africa and Australia.

1. **T. aculeata,** *Pers.; DC. Prodr.* ii. 83; prickly, leaflets sessile elliptic obovate oblong or lanceolate crenulate, fruit 3–7-celled. *W. & A. Prodr.* 149; *Thwaites Enum.* 69; *Grah. Cat. Bomb. Pl.* 37; *Dalz. & Gibs. Bomb. Flor.* 46; *Wight Ill.* t. 66; *Wall. Cat.* 9042; *Bedd. Flor. Sylvat. Anal. Gen.* xlii. t. vi. f. 4. T. asiatica, *Lamk. Dict.* vii. 693; *Ill.* ii. 116. T. nitida, *Lamk. Ill.* t. 139, f. 1. ? T. angustifolia, *Lamk. Dict. l.c.* 694. T. angustifolia, *Miq. in Plant. Hohen.* 470. T. rubricaulis, *Willd.* T. floribunda, *Wall. Pl. As. Rar.* iii. p. 37. Zanthoxylon nitidum, *Wall. Cat.* 1207, *from China* (*not of DC.*). Z. floribundum, *Wall. Cat.* 1206; *Pl. As. Rar.* iii. t. 232. Scopolia aculeata, *Sm. Ic. ined. sub* t. 34; *Roxb. Fl. Ind.* i. 616. Limonia oligandra, *Dalz. in Kew Journ. Bot.* ii. 258. Paullinia asiatica, *Linn. Sp. Pl.* 524.—*Burm. Flor. Zeyl.* 58, t. 24; *Rheede Hort. Mal.* v. 81, t. 41.

Subtropical Himalaya, from Kumaon eastwards to Bhotan, ascending to 5000 ft.; Khasia Mts., ascending to 6000 ft., and throughout the Western Peninsula and Ceylon.—Distrib Sumatra, Java, China, the Philippine Islands.

A rambling sarmentose shrub, prickly or not. *Leaflets* sessile, 1–3 by $\frac{1}{6}$–1 in., glabrous, rounded, narrowed or subacute at the tip, which is acute obtuse or notched, many-nerved, green on both surfaces, coriaceous. *Cymes* axillary, compressed, longer or shorter than the leaves. *Flowers* $\frac{1}{6}$ in. diam., white. *Calyx* glandular. *Petals* 5, imbricate. *Stamens* not exceeding the petals. *Ovary* usually 5-celled; style short, stigma 5-lobed; ovules 2, superposed in each cell. *Fruit* globose, size of a large pea, 3-5-grooved, orange-coloured, 3–5-celled. *Seeds* solitary in each cell.—Whole plant hot and pungent.

2. **T. bilocularis,** *W. & A. Prodr.* 149; unarmed, leaflets elliptic-lanceolate acuminate quite entire, tip notched, flowers 2–3-merous, fruit 2-celled. *Bedd. Flor. Sylvat.* xliii.; *Icones*, t. 167. Dipetalum biloculare, *Dalz. in Kew Journ. Bot.* ii. 38.

Western Peninsula; Courtallum, *Wight;* Anamallay forests, alt. 2500–3000 ft., *Beddome;* Concan and Canara, *Dalzell.*

A tree (Beddome), trunk often 3 ft. in girth, foliage dense, always unarmed. *Leaflets* 6–10, sessile or petioled, nerved as in the other species, apparently quite entire. *Petals* 2–3, slightly imbricate. *Stigma* large, peltate. *Fruit* as large as a cherry.—I have seen but two specimens, both Wight's, and in fruit only. I follow Dalzell in considering his *Dipetalum* to be the same; he seems to have found it in a very early state, and says the stamens were 6, and inflorescence terminal, which latter is not the case in Wight's specimens; Beddome, however, describes the inflorescence as terminal or from the upper axils, and much shorter than the petiole. Beddome further describes it as a beautiful tree of considerable size, with dense dark-green foliage; he found the females in March, but not the males; 3-petaled flowers were much more common than 2-petaled.

10. **ACRONYCHIA,** Forst.

Trees. *Leaves* opposite or alternate, 1- rarely 3-foliolate, leaflets quite entire. *Flowers* small or rather large, yellow, in peduncled axillary and terminal corymbs, polygamous. *Calyx* 4-lobed, sometimes enlarged after flowering, imbricate. *Petals* 4, spreading, revolute, valvate. *Stamens* 8, inserted under a thick 8-angled tomentose disk, filaments subulate, the alternate longer. *Ovary* inserted in the hollowed tip of the disk, tomentose, 4-celled; style terminal, stigma 4-grooved; ovules 2, superposed in each cell. *Fruit* a 4-celled drupe, or 4-valved loculicidal capsule. *Seeds* often exserted and pendulous from a slender funicle, testa black, albumen copious; embryo straight, cotyledons oblong flat.—DISTRIB. About 15 species, natives of tropical Asia, Australia and the Pacific Islands.

1. **A. laurifolia,** *Blume Bijd.* 245; glabrous, leaves subopposite 1-foliolate, leaflet elliptic subobovate or oblong, cymes long-peduncled very broad corymbose, buds linear, petals linear villous within. A. pedunculata, *Miq. Fl. Ind. Bat. Suppl.* 532; *Thwaites Enum.* 409 *and* 69 (Cyminosma); *Bedd. Flor. Sylv. Anal. Gen.* xlii. t. 6, f. 4. Cyminosma pedunculata, *DC. Prodr.* i. 722; *Wall. Cat.* 1205; *W. & A. Prodr.* i. 147; *Wight Ill.* i. 165, t. 65; *Dalz. & Gibs. Bomb. Flor. Suppl.* 17. C. Ankenda, *Gærtn. Fruct.* i. 280, t. 58, f. 6 (bad); *DC. l.c.* Clausena simplicifolia, *Dalz. in Kew Journ. Bot.* iii. 180. Jambolifera pedunculata, *Vahl Symb.* iii. 52, t. 61. Gela lanceolata, *Lour. Fl. Coch.* i. 232. Selas lanceolatum, *Spreng. Syst.* ii. 216. Ximenia? lanceolata, *DC. Prodr.* i. 533. Indeterm. *Wall. Cat.* 9028—*Rheede Hort. Mal.* v. p. 29, t. 15.

SIKKIM HIMALAYA, in hot valleys, alt. 3–4000 ft.; KHASIA MTS., alt. 0–4000 ft.; ASSAM; CHITTAGONG; EASTERN PENINSULA, from Rangoon to Penang and Malacca; WESTERN PENINSULA, on the Ghats from Concan to Travancor, ascending to 5000 ft.; CEYLON.—DISTRIB. Sumatra, Java, Cochin China.

A small glabrous tree or shrub, with somewhat silky or puberulous young shoots and inflorescence. *Leaves* very variable; leaflets 2–6 in., obtuse or obtusely acuminate, membranous, quite entire, much veined and reticulate on both surfaces. *Cymes* axillary, slender, oppositely branched, spreading, long-peduncled, corymbose; bracts and bracteoles small. *Flowers* $\frac{1}{3}$–$\frac{3}{4}$ in. diam., fragrant, yellowish-white; buds linear-oblong, obtuse; pedicels slender. *Sepals* very small, rounded. *Petals* linear-oblong from a broad base, obtuse, revolute, more or less villous on the inner surface. *Filaments* equalling the petals, slender, bearded below. *Ovary* villous; style short, stigma capitate. *Drupe* very variable in size, from a pea to a small cherry, 3–5-celled, glabrate, usually with a narrowed angular or grooved tip, sometimes narrowed at the base, sometimes deeply lobed from the tip downwards.

VAR. 1; leaflets oblong, flowers about $\frac{1}{2}$ in. diam.

VAR 2; leaflets 5–7 in. oblong-lanceolate, petals very sparingly villous within, drupe globose $\frac{4}{10}$ in. diam. glabrous.—Sikkim, *J. D. H.*

VAR. 3; leaflets 4–5 in. cymes very slender, flowers smaller ($1\frac{1}{3}$ in.), fruit small contracted at the base.—Western Peninsula.

VAR. 4; leaflets very small $1\frac{1}{2}$–2 by $\frac{1}{4}$–$\frac{1}{2}$ in. very membranous narrowly elliptic-lanceolate, cymes few-flowered.—Pulney Mts., *Wight.*

VAR. 5; cymes few-flowered, fruit small turbinate lobed at the top.—Mergui, *Griffith.*

VAR. 6; peduncles stout thick, branches 3-flowered, flowers large almost 1 in. diam., petals much bearded within, fruit nearly $\frac{2}{3}$ in. diam. subglobose puberulous.—Malacca? *Maingay.*

2. **A. Porteri,** *Hook. f.*; leaves opposite 1-foliolate, cymes panicled narrow, buds globose, petals ovate minutely pilose within.—*Wall. Cat.* 7756.

PENANG, *Porter*, *Maingay* (*Kew distrib.* 280); MALACCA, *Griffith.*

A lofty tree. *Petiole* $\frac{1}{2}$ in.; leaflets 3–6 in., usually shortly acuminate, quite glabrous and entire, nerves beneath slender, spreading. *Cymes* 3–4 in.; peduncle and short branches stout, more or less hoary; bracts and bracteoles small, persistent, obtuse. *Flowers* $\frac{1}{8}$ in. diam; buds $\frac{1}{12}$ in., puberulous. *Sepals* 4, fleshy, obtuse. *Petals* broad, short. *Disk* pulvinate, bright yellow, glabrous. *Filaments* with dilated bases. *Ovary* imperfect; styles minute, rudimentary, connate. *Drupe* $\frac{1}{4}$ in. diam., nearly globose, obtusely 4-angled, minutely pitted, 4-celled, cells 2-seeded. *Seeds* subcollateral, oblong-reniform, plano-convex; testa black, brittle.—The above description of the flowers is taken very much from Maingay's ms. which was drawn up from fresh specimens.

11. **SKIMMIA,** Thunb.

Small glabrous strong scented shrubs. *Leaves* alternate, petioled, simple, quite entire. *Flowers* crowded, in terminal panicles, white, polygamous. *Calyx* 4–5-lobed, imbricate. *Petals* 4–5, oblong, valvate or slightly imbricate. *Disk* obsolete. *Stamens* 4–5, hypogynous, imperfect in the ♀ flower. *Ovary* obovoid, (of 1–5 rudimentary carpels in the ♂ flower) 2–5-celled; style stout, terminal, or 0, stigma capitate 2–5-lobed; ovules solitary, pendulous from the top of each cell. *Drupe* ovoid, fleshy, with 2–5 cartilaginous 1-seeded stones. *Seed* pendulous, testa coriaceous, albumen fleshy; embryo straight, cotyledons oblong flat, radicle short.—DISTRIB. Species 4, Himalayan and Japanese.

1. **S. Laureola,** *Hook. f.*; leaves oblong linear-oblong elliptic-lanceolate or obovate obtuse acute or caudate-acuminate, flowers 5-merous. Limonia? Laureola, *DC. Prodr.* i. 536. L. Laureola, *Wall. Pl. As. Rar.* iii. 23, t. 245; *Cat.* 6357. Anquetilia Laureola, *Dcne. in Jacq. Voy. Bot.* 161, t. 161. Laureola fragrans, *Roem. Synops.* fasc. i. 74.

Throughout the TEMPERATE HIMALAYA, from Marri to Mishmi, alt. 6–10,000 ft.; KHASIA MTS., alt. 5–6000 ft.—DISTRIB. Affghanistan.

A glabrous shrub branched from the base, 3–5 ft. high, evergreen, strongly aromatic; branches and foliage very bright green. *Leaves* exceedingly variable in size and shape, 3–7 in., softly coriaceous, quite entire, nerves indistinct; petiole short, stout. *Panicles* terminal, short, dense-flowered, branched; females smaller; bracts and 2 bracteoles deciduous. *Flowers* about $\frac{1}{2}$ in. diam., yellowish-white, inodorous, shortly pedicelled. *Sepals* small. *Petals* oblong, obtuse. *Filaments* stout, subulate. *Ovary* ovoid, minute, conic and 4-cleft in the ♂ flowers. *Fruit* $\frac{1}{2}$–$\frac{3}{4}$ in. long; ellipsoid, red, fleshy. *Seeds* 1–3; embryo green.—Very similar to the Japanese *S. japonica*, Thunb., but the flowers are 4-merous in that species.

12. **GLYCOSMIS,** Correa. Aurantieæ

Unarmed shrubs or trees. *Leaves* 1-foliolate or imparipinnate; leaflets alternate. *Flowers* small, in axillary rarely terminal panicles. *Calyx* 4–5-partite, segments broad imbricate. *Petals* 4–5, imbricate. *Stamens* 8–10, free, inserted round a disk, filaments subulate dilated below; anthers small, with often a dorsal or apical gland. *Ovary* 2–5-celled; style very short, persistent, stigma simple; ovules solitary and pendulous in each cell. *Berry* small, dry or fleshy, 1–3-seeded. *Seeds* oblong, testa membranous; cotyledons equal, radicle very short.—DISTRIB. Species 5, Asiatic and Australian.

I have followed Professor Oliver in the limitation of the forms of this troublesome Genus, which might very well be included in one species.

1. **G. pentaphylla,** *Correa in Ann. Mus.* vi. 384; leaves 3–5 rarely 1-foliolate, leaflets polymorphous usually elliptic-lanceolate, ovary 5- rarely

3–4-celled glabrous, style very short stout. *DC. Prodr.* i. 538; *W. & A. Prodr.* 93; *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 37; *Wall. Cat.* 6374; *Thwaites Enum.* 45 *and* 406; *Dalz. & Gibs. Bomb. Fl.* 29; *Bedd. in Trans. Linn. Soc.* xxv. 211; *Flor. Sylv. Anal. Gen.* xliii. t. 6, f. 6. G. chylocarpa, *W. & A. Prodr.* 93. G. arborea, *DC. l.c.; Wall. Cat.* 6373; *Thwaites Enum.* 45. G. Retzii, *Roem. Synops.* fasc. i. 41. Limonia pentaphylla, *Retz Obs.* v. 24; *Roxb. Cor. Pl.* t. 84; *Flor. Ind.* ii. 381. L. arborea, *Roxb. Cor. Pl.* t. 85; *Fl. Ind. l.c.; Bot. Mag.* t. 2074. Myxospermum chylocarpum, *Roem. Synops.* fasc. i. 40.

Throughout TROPICAL and SUBTROPICAL HIMALAYA, ascending to 7000 ft. in Sikkim from the Sutlej river in the N.W., southwards to UPPER ASSAM, TRAVANCOR, MALACCA, and CEYLON.—DISTRIB. Malay Archipelago, China, Philippine Islands, Borneo, Australia.

One of the commonest plants in India, if, as most suppose, the shrubby *G. pentaphylla* and arboreous *G. arborea* are the same species. This is a point to which observers in India should pay attention. Thwaites, who distinguished *arborea* at one time by the short glandular ovary narrower than the spheroid disk, short depressed style as broad as the distinct discoid stigma, and the smaller panicles, finds these characters not to hold as he expected. The *leaves*, which are evergreen, vary from 1–5-foliolate, and the leaflets from 1–9 inches long, and are broad or narrow, obtuse acute or acuminate, oblong elliptic or obovate or lanceolate, quite entire or crenulate, rather membranous, pale and reticulately veined. *Flowers* small, white, in pubescent panicles that are very variable in size and composition. *Berry* white, globose, usually the size of a large pea, in var. 3, as large as a cherry.—I follow Prof. Oliver's classification of the first two varieties, to which he gave many weeks of study with copious materials at his command. The 3rd is added from Wight's Illustrations and Herbarium. Upwards of 200 specimens are preserved in the Herbarium at Kew from different collectors and habitats.

VAR. 1; leaves usually 3- rarely 1- or 5-foliolate, leaflets 4–9 in. lanceolate or oblong or obovate-lanceolate quite entire or obscurely crenulate, panicles towards the tips of the branches usually elongate many-flowered, ovary usually covered with mamillary glands 5-celled connate at the base with the disk.—Throughout India.

Subvar.; leaves narrower.—Canara and Mysore.

VAR. 2; leaves usually 3–5-foliolate (except subvar. 1), leaflets elliptic or elliptic-lanceolate, panicles small few- or many-flowered, flowers smaller, ovary 4–5 celled scarcely mamillate constricted at the base and thus free from the disk.—G. triphylla, *Wight in Hook. Bot. Misc.* iii. 298; *Suppl.* t. 39; *Ic.* t. 167; *W. & A. Prodr.* 93. G. nitida, *W. & A. Prodr. l.c.*—Western Peninsula, Ceylon, Tenasserim.

Subvar. 1. *longifolia;* leaves usually 1-foliolate, leaflets 3–10 in. oblong or obovate-lanceolate often acuminate or even caudate, panicles short 1–2 in., or if terminal 3–4 in.—Assam, the Khasia Mts., Rangoon, and Malacca.

Subvar. 2. *macrophylla;* leaves 3–5-foliolate with the leaflets 3½–6 in., or 1-foliolate with the leaflets 8–12 by 2½–6 in., disk thicker broader than the ovary. G. macrophylla, *Lindl. in Wall. Cat.* 6377.—Assam, Penang, and Tavoy. ? Chionotria rigida, *Jack in Mal. Misc. ex Hook. Comp. Bot. Mag.* i. 155. Ch. monogyna, *Walp. Rep.* i. 382; *Roem. Synops.* fasc. i. 73.

Subvar. 3. *angustifolia;* leaflets narrower lanceolate 1½–3 by ¼–¾ in. G. angustifolia, *Lindl. in Wall. Cat.* 6378; *W. & A. Prodr.* 93. Limonia? angustifolia, *Wall. Cat.* 6360.—Tanjore, Mysore and Tavoy.

Subvar. 4; panicles axillary very short, ovary scarcely constricted at the base, style equalling the ovary.—Sikkim, Silhet, the Khasia Mts., Cachar, and Chittagong.

VAR. 3. *macrocarpa;* fruit ¾–1 in. diam. constricted at the base. G. macrocarpa, *Wight Ill.* i. 109.—Courtallum, *Wight.*

2. **G. bilocularis,** *Thwaites Enum.* 45; leaves 3–5-foliolate, ovary 2-celled glabrous seated on the thickened disk. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 38.

CEYLON, in the Maturatte district, *Thwaites.*

A shrub. *Leaflets* 1¾–2½ by ½–¾ in., lanceolate or trapezoid-lanceolate, subacuminate, obtuse at the base, pale beneath. *Panicles* axillary, very short, few-flowered. *Sepals* broad-ovate or triangular-ovate. *Petals* oblong or elliptic oblong. *Stamens* alternately shorter (much and irregularly dilated, concave within, *Thw.*); anthers small, cordate. *Disk* short, thick, rather broader than the ovary.—I have seen only scraps of this. I take the characters from Oliver and Thwaites.

3. **G. sapindoides,** *Lindl. in Wall. Cat.* 6376; leaves 5–7-foliolate, panicles branched from the base stout many-flowered, ovary 2–3-celled, hairy about as long as the thick style.

Penang, *Wallich, Maingay.*—Distrib. Java.

A tree 3 (? 30) feet high, with the trunk as thick as a man's thumb (*Maingay*). *Branches* terete, glabrous. *Leaflets* 4–9 in., oblong or lanceolate, subacuminate. *Panicles* 1–3 in., subpyramidal, branches short stout. *Flowers* shortly and stoutly pedicelled. *Sepals* orbicular-ovate. *Petals* oblong or narrow oblong. *Disk* small or obsolete. *Ovary* shortly stipitate.—Kurz (Journ. Beng. As. Soc. 1871, pt. ii. 49) suggests that this will prove a form of *G. chlorosperma,* Sprengel (Cur. Post. 162), but I do not see how this can be, Sprengel's plant being described as having terminal inflorescence.

4. **G. puberula,** *Lindl. in Wall. Cat.* 6375; leaves usually 3-foliolate, ovary 4–5-celled shortly stipitate oblong pilose. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 39.

Penang and Singapore, *Wallich.*

Leaflets 2–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., caudate-acuminate. *Pedicels* $\frac{1}{12}$–$\frac{1}{10}$ in. *Disk* small, adnate to the ovary. *Style* very short.—Perhaps a var. of *G. pentaphylla,* from which it differs chiefly in the pilose ovary (*Oliver*).

EXCLUDED SPECIES.

G. crenulata, *Turcz. in Mosc. Bull. Soc. Nat.* 1858, pt. ii. 250, is *Murraya crenulata,* Oliv. (in Journ. Linn. Soc. v. Suppl. ii. 29), a native of Luzon and not of Singapore as Turczaninow states.

13. MICROMELUM, Blume.

Unarmed trees. *Leaves* imparipinnate; leaflets alternate, oblique. *Flowers* in large terminal corymbose panicles. *Calyx* cupular, 3–5-toothed or lobed. *Petals* 5, free, thick, valvate or subimbricate. *Stamens* 10, free, inserted round a short or long disk, filaments linear-subulate, alternate shorter. *Ovary* 5- rarely 2–6-celled; style constricted at the base, deciduous, stigma obtuse or capitate; ovules 2, superposed in each cell. *Berry* small, dry, usually 1–2-seeded, septa spirally twisted. *Seeds* oblong, testa membranous; cotyledons leafy, crumpled, radicle long.—Distrib. Species 3 or 4, tropical Asiatic and Oceanic.

1. **M. pubescens,** *Blume Bijd.* i. 137; pubescent, leaflets 9–15 ovate to broad lanceolate, corymbs subsessile or peduncled finely pubescent, calyx cupular entire or 5-lobulate, ovary 5- rarely 2–4-celled more or less hairy, stigma capitate slightly broader than the style, berry glabrous. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 40; *Bedd. Flor. Sylv. Anal. Gen.* xliii. t. 7, f. 1; *Thwaites Enum.* 46. Bergera integerrima, *Roxb. Fl. Ind.* ii. 376; *Wall. Cat.* 6371. Aurantiacea, *Wall. Cat.* 8517, 8518.

Central and Eastern tropical Himalaya; Nipal, *Wallich;* Sikkim, *J. D. H.;* Assam; Khasia Mts.; Chittagong and from Birma southward to Malacca; Ceylon. —Distrib. Java, China and Eastward to the Pacific Islands.

A small umbrageous tree. *Leaves* 6–18 in.; leaflets subopposite and alternate, short-petioled, waved, often caudate-acuminate, base often cordate, pubescent beneath, rarely above. *Cymes* terminal, decompound, tomentose; peduncle long or short; pedicels

$\frac{1}{12}$–$\frac{1}{8}$ in.; bracts minute. *Flowers* variable in size, $\frac{1}{8}$–$\frac{1}{2}$ in. diam., heavy-scented; buds oblong. *Petals* narrow-oblong, subacute, finely pubescent. *Stamens* alternately longer; anthers didymous. *Ovary* usually hairy; 2–7- but usually 5-celled. *Berry* ovoid or oblong, as large as a large pea, yellow. *Seed* nearly as long.—There is a specimen from N. W. India in Royle's Herbarium, but probably from a garden, as he makes no mention of it in his Illustrations of Himalayan Plants. The following varieties are established by Prof. Oliver:—

VAR. 1; leaflets 2$\frac{1}{2}$–3$\frac{1}{2}$ by 1–1$\frac{1}{2}$ in., calyx subentire, style equalling or exceeding the ovary. Bergera villosa, *Wall. Cat.* 6372. Cookia punctata, *Hassk.*; *Miq. Fl. Ind. Bat.* i. pt. 2, 524.—Penang (Java, Philippines).

VAR. 2; leaflets 3$\frac{1}{2}$–6 by 1–1$\frac{1}{2}$–2 in., cymes broader, flowers larger, calyx with triangular lobes.—B. integerrima, *Roxb. l.c.*; *DC. Prodr.* i. 537. B. villosa, *Wall. Cat.* 6372.—Sikkim, ascending to 4000 ft.; Nipal, Assam, Birma.

VAR. 3; leaflets narrower 1$\frac{1}{2}$–3$\frac{1}{2}$ by $\frac{1}{2}$–1$\frac{1}{2}$ in., calyx lobulate, style often exceeding the ovary.—Ceylon.

2. **M. hirsutum,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 40; tomentose, leaflets 10–25 obscurely toothed, cymes densely tomentose almost hirsute, ovary 5-celled, stigma about as broad as the style, berry very hairy.—Aurantiacea, *Wall. Cat.* 8516.

PENANG, *Jack*, *Porter*, &c.; SINGAPORE, *Wallich*; PEGU, *McLelland*; TENASSERIM, *Griffith*, *Helfer*.—DISTRIB. Philippine Islds.

Very like *M. pubescens*, and probably only a variety of that plant, but more tomentose, especially the inflorescence, which is almost hirsute, as is the berry. The flowers are as small as the smallest var. of *M. pubescens.*

14. **MURRAYA,** Linn.

Unarmed shrubs or small trees. *Leaves* pinnate; leaflets alternate, petioled, base oblique or cuneate. *Flowers* solitary and axillary, or in terminal corymbs or axillary cymes. *Calyx* 5-fid or -partite. *Petals* 5, free, imbricate. *Stamens* 10, inserted round an elongate disk, filaments linear-subulate, the alternate shorter; anthers short, small. *Ovary* 2–5-celled, narrowed into a long deciduous style, stigma capitate; ovules solitary or 2 superimposed or collateral in each cell. *Berry* 1–2-celled, oblong or ovoid, 1–2-seeded. *Seed* with a woolly or glabrous testa; cotyledons equal.—DISTRIB. Species 4, tropical Asiatic.

1. **M. exotica,** *Linn.*; leaves glabrous 3–8-foliolate, leaflets oblique, cymes terminal corymbose. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 28; *Roxb. Fl. Ind.* ii. 374; *Wall. Cat.* 6368; *Thwaites Enum.* 45; *Wight Ic.* t. 96; *Bedd. Flor. Sylvat. Anal. Gen.* xliv. t. 7, f. 2; *Brandis For. Flor.* 48. Chalcas intermedia *and* C. paniculata, *Roem. Synops.* fasc. i. 48 and 49.

Throughout the hotter parts of INDIA, from GARWHAL to ASSAM and BIRMA, and southward to CHITTAGONG, TRAVANCOR, and CEYLON.—DISTRIB. Eastward to China, Australia, and the Pacific Islands.

A very variable evergreen plant, of which two forms occur—a bushy and a subarboreous. *Branches* slender, young parts pubescent. *Leaves* 4–5 in.; leaflets shortly petioled, 1–3 in., ovate or obovate, or rhomboid, obtuse or obtusely acuminate and often notched at the tip, usually very oblique at the base, shining above, quite entire, newer slender. *Corymbs* terminal and axillary, few- or many-flowered. *Flowers* campanulate, $\frac{1}{2}$ in. diam., pure white, very fragrant. *Sepals* glandular, acute. *Petals* oblong-lanceolate, spreading above. *Stamens* alternately longer. *Ovary* 2-celled; style slender, stigma capitate; ovules solitary in each cell or 2 superposed. *Berry* $\frac{1}{2}$ in., apiculate, globose or ovoid, 1–2-seeded.

VAR. 1; shrubby, corymbs many-flowered, ovary 2-celled.—M. exotica, *Auct.* M.

exotica *and* brevifolia, *Thwaites Enum.* 45.—Common in Northern India; Ceylon in Gardens only.

VAR. 2; arboreous, corymbs few-flowered or flowers subsolitary, ovary 2-celled.—M. paniculata, *Jack in Mal. Misc.* i. 31 *ex Hook. Bot. Misc.* ii. 79; *DC. Prodr.* i. 537; *W. & A. Prodr.* 94; *Dalz. & Gibs. Bomb. Flor.* 29. M. sumatrana, *Roxb. Fl. Ind.* ii. 375; *Wall. Cat.* 6369. Chalcas paniculata, *Linn.* Ch. sumatrana, *Roem. Synops. fasc.* i. 49.—Chiefly in the Western Peninsula. Ceylon, ascending to 3000 ft.

VAR. 3; ovary 4–5-celled.—M. Glenieii, *Thwaites Enum.* 406; *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 29.—Trincomalee in Ceylon.—Thwaites, l.c., gives Oliver as the author of this species, but the latter quotes Thwaites' mss. as his authority.

2. **M. Kœnigii,** *Spreng. Syst. Veg.* ii. 315; leaves pubescent or glabrous 10–20-foliolate, leaflets small oblique, cymes terminal, ovary 2-celled. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 29; *Bedd. Flor. Sylv. Anal. Gen.* xliv.; *Brandis For. Flor.* 48. Bergera Kœnigii, *Linn.; W. & A. Prodr.* 94; *Wight Ic.* t. 13; *Wall. Cat.* 6370; *Roxb. Cor. Pl.* ii. t. 112; *Fl. Ind.* ii. 375; *Dalz. & Gibs. Bomb. Flor.* 29.

Along the foot of the Himalayas, from GARWHAL to SIKKIM, ascending to 5000 ft.; BENGAL, PEGU, and southward to TRAVANCOR and CEYLON; often cultivated.

A small strong-smelling umbrageous tree, pubescent or tomentose, rarely glabrous, deciduous. *Leaves* often 1 foot long, narrow; petiole slender, terete; leaflets petioled, 1–1½ in., variable, usually obliquely ovate, obtusely acuminate, tip notched, crenulate, sometimes suborbicular or lanceolate. *Corymbs* peduncled, many-flowered. *Flowers* white, ⅓ in. long, subcampanulate, ebracteate. *Sepals* acute. *Petals* linear-oblong, obtuse, dotted. *Stamens* alternately longer, filaments dilated below. *Ovary* 2-celled; style cylindric, stigma capitate grooved; ovules solitary in each cell, or 2-superposed. *Fruit* ovoid or subglobose, ⅓ in. diam., black, rugose. *Seeds* imbedded in mucilage.—Leaves much eaten in curries.

3. **M. elongata,** *Alph. DC. mss. in Wall. Herb.*; leaves glabrous 4–6-foliolate, leaflets 4–5 in. ovate- or elliptic-lanceolate obtusely caudate-acuminate tip notched coriaceous.

BIRMA, at Taong-dong, *Wallich.*

A very different looking plant from any of the forms of *M. exotica.*—Bark on the slender branches pale yellow. *Petiole* with rachis 3 in., angular; leaflets pale bright-brown when dry, much longer and more lanceolate than in any form of *M. exotica. Fruit* ⅔ in. long, narrowly ellipsoid, as in the last-named species, of which it may be a form.

15. **CLAUSENA,** Burm.

Unarmed shrubs or trees. *Leaves* imparipinnate, usually deciduous, leaflets membranous. *Flowers* small, in terminal or axillary cymes panicles or lax racemes. *Calyx* 4–5-lobed or partite. *Petals* 4–5, free, membranous, margins imbricate. *Stamens* 8–10, inserted round an elongated disk, the alternate shorter, filaments usually dilated or arched and concave below the subulate tip; anthers short. *Ovary* stipitate, 4–5 (rarely 2–3-) celled; style usually distinct, deciduous, stigma obtuse entire or 2–5-lobed; ovules 2, collateral or superposed in each cell. *Berry* small, ovoid, oblong or globose, 2–5-celled. *Seeds* oblong, testa membranous; cotyledons equal, plano-convex.—DISTRIB. Species about 14, chiefly tropical Asiatic, with a few African and Australian.

* *Inflorescence terminal, panicled.*

1. **C. pentaphylla,** *DC. Prodr.* i. 538; tomentose above, leaves 3–7-foliolate, leaflets 5–9 in. ovate acuminate tomentose or glabrate beneath, flowers 4-merous, ovary hairy, style very short glabrous. *Don Gen. Syst.* i.

586; *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 30; *Brandis For. Flor.* 49. Amyris pentaphylla, *Roxb. Fl. Ind.* ii. 247 (error in descript. of ovules); *Wall. Cat.* 8519. Limonia mollis, *Wall. Cat.* 6362. Gallesioa pentaphylla, *Roem. Synops.* fasc. i. 45.

Tropical Western Himalaya, from Kumaon to Nipal, and in the Doom and Sal forests of Oudh; Cawnpore, *Hardwick.*

Branchlets terete, softly tomentose, as thick as a goose-quill. *Leaves* large; petiole often shorter than the leaflet, terete; leaflets membranous, narrow and more or less oblique at the cuneate base, quite entire or obscurely crenate, very shortly petioled, usually softly tomentose beneath; nerves spreading. *Panicle* erect, 4–10 in. long, branches long stout much divided, all very softly downy. *Flowers* ¼ in. diam.; buds globose. *Sepals* triangular, acute. *Petals* oblong, concave, obtuse, glabrous or hairy outside. *Filaments* short, broad. *Fruit* ⅓ in. diam., broadly oblong, glabrous, pale orange, papillose.—Wallich's 8519, from the Calcutta Gardens, have very large (10 by 4½ in.) membranous sometimes 1-foliolate leaves, almost glabrous beneath and glabrous petals.

2. **C. heptaphylla,** *W. & A. Prodr.* 95, *in note*; glabrous, leaves 5–9-foliolate, leaflets 2–5 in. equal or slightly oblique at the base, flowers 4–5-merous, ovary obovoid 4-grooved glabrous, style as long as the ovary and as broad as the stigma. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 30. Amyris heptaphylla, *Roxb. Fl. Ind.* ii. 248; *Wall. Cat.* 8508.

Eastern Bengal, near Calcutta, *Roxburgh*; Silhet, *Wallich*; Khasia Mts., ascending to 4000 ft., and Chittagong, *H. f. & T.*; Tenasserim, *Griffith.*

A branching bush, smelling strongly of aniseed; branchlets glabrous, as thick as a crow-quill. *Leaves* 6–16 in.; petiole cylindric, slender; leaflets sometimes 8 in., shortly petioled, membranous, ovate or lanceolate, acuminate, very obscurely crenulate, pale beneath; nerves and costa slender. *Panicle* with slender spreading branches, on which the flowers are racemed. *Flowers* ⅙ in. diam., pedicels slender, buds globose, yellow-white. *Petals* oblong, glabrous. *Berry* ½ in. long, oblong, white reddish or pale yellow, glandular.

3. **C. macrophylla,** *Hook. f.*; softly villous, leaves 5-foliolate, leaflets 5–7 in. equal or suboblique obscurely toothed tomentose beneath, flowers glabrous, stamens equal, filaments very short, ovary stipitate glabrous 4-lobed tubercled, style as long as the ovary and as broad as the stigma. C. heptaphylla *var.* ? pubescens; *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 30. Cookia ? macrophylla, *Lindl. in Wall. Cat.* 6367.

Birma, on the banks of the Saluen at Trogla, *Wallich.*

I have seen but one specimen. *Branchlets* as thick as a goose-quill, and as well as the petiole and panicle clothed with a soft spreading close-set velvety tomentum. *Leaves* 1 ft.; leaflets very shortly petioled, acuminate, pale on both surfaces, nerves strong arched, margin with shallow small rather distant teeth, midrib stout; common petiole stout, terete. *Panicle* stout, erect, with the peduncle 1 ft. long; branches strict, erecto-patent, secondary branchlets short. *Flowers* crowded, ⅒ in. diam., shortly pedicelled, buds globose. *Calyx-lobes* 4, minute, rounded, acute. *Petals* broadly oblong, concave, membranous, covered with large glands. *Filaments* much dilated below; anthers large, oblong. *Ovary* stipitate, tubercled with very large glands; ovules 2, collateral in each cell. *Fruit* immature, oblong, tip obscurely 4-angled and truncate.

4. **C. excavata,** *Burm. Fl. Ind.* 87; pubescent or tomentose, leaves 15–30-foliolate, leaflets 2–3½ in. oblique at the base, flowers 4-merous, ovary ovoid or elliptic sub-4-gonal stipitate hairy or hirsute, style stout about equalling the ovary. *DC. Prodr.* i. 538; *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 31. Murraya Burmanni, *Spreng. Syst. Veg.* ii. 315. Amyris suma-

trana *and* punctata, *Roxb. Fl. Ind.* ii. 250, 251; *Wall. Cat.* 8512. Cookia graveolens, *W. & A. Prodr.* 95; *Wall. Cat.* 8515. Gallesioa graveolens, *Roem. Synops. fasc.* i. 45.

TROPICAL HIMALAYA, alt. 2000 ft., from Nipal, *Wallich*, to Bhotan, *Griffith*; SILHET PEGU, and CHITTAGONG, *Wallich*, &c. EASTERN PENINSULA; MALACCA, *Griffith*; PENANG, *Porter*, &c.—DISTRIB. Sumatra, Java, Borneo.

A tree, fetid when bruised, smelling of Sassafras (*Roxburgh*); branchlets as thick as a crow-quill and as well as the inflorescence petioles and leaflets more or less softly tomentose. *Leaves* 6–12 in.; petiole slender, cylindric, more tomentose than the leaflets which are very oblique at the base, petioled, ovate or lanceolate, acuminate, membranous, obscurely crenate, upper often falcate. *Panicle* 4–12 in. high, pyramidal; branches spreading, alternate. *Flowers* shortly pedicelled, $\frac{1}{6}$ in. diam., white; buds globose. *Petals* oblong, glabrous. *Fruit* $\frac{3}{4}$ in., broadly oblong.

VAR. *villosa*; clothed with soft spreading hairs, petals hirsute.—Rangoon.

5. **C. Wampi,** *Blanco Flor. Filip.* 358; branches petioles and inflorescence pustular, leaves 5–9-foliolate, leaflets 2–4 in. broad ovate elliptic or lanceolate waved or crenulate, flowers 4–5-merous, ovary pilose usually 5-celled, style very short glabrous above, stigma 5-lobed, ovules 2 in each cell superposed. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 34. Cookia punctata, *Sonnerat Voy.* iii. 258, t. 130; *DC. Prodr.* i. 537; *Roxb. Fl. Ind.* ii. 382; *Wall. Cat.* 6366.

Cultivated in INDIA and the Eastern Islands; native probably of China.

A small glabrous tree, with a sweet terebinthine odour. *Leaves* 4–10 in.; petiole cylindric, glabrous or hairy; leaflets petioled, oblique, shining above, tip obtuse notched. *Panicle* large, erect, compound, branched from the base, branches stout. *Flowers* $\frac{1}{3}$ in. diam., white; pedicels very short, stout; buds globose. *Petals* broad, concave. *Fruit* nearly globose; rind tough, covered with glands full of green balsamic oil. *Seed* solitary.

6. **C. Wallichii,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 35; leaves 13–17-foliolate, leaflets rhomboid or oblong-lanceolate crenulate glabrous, petiole and rachis obscurely winged, flowers 5-merous, ovary glabrous 4–5-celled, style distinct, ovules 2 superposed in each cell.

BIRMA, Chappedong hill, *Wallich*.

Branchlets terete, black when dry, smooth. *Leaves* 8–12 in.; leaflets 2–3 in., alternate, oblique, candate-acuminate with an obtuse notched tip, narrowed into a cuneate base; petiole very slender, margined rather than winged. *Panicle* 3–5 in. long and broad, much branched; branches erecto-patent, glabrous, strict. *Flowers* subsessile, $\frac{1}{8}$ in. diam., glabrous. *Calyx* 5-partite. *Petals* imbricate. *Stamens* 10, free, filaments thickened in the middle. *Ovary* on a short narrow stalk, usually 5-celled; style very short, grooved, as broad as the stigma; ovules obliquely superposed.—Oliver remarks that when the ovary is 4-celled, the ovules in at least one cell are collateral, as also that this species weakens the distinction between *Clausena* and *Murraya*.

7. **C. indica,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 36; glabrous, leaves 7–11-foliolate, leaflets oblique polymorphous crenulate, flowers 5-merous, ovary 2–5-celled glabrous papillose, ovules 2 collateral in each cell. *Bedd. Flor. Silv. Anal. Gen.* xlv. Piptostylis indica, *Dalz. in Kew Journ. Bot.* iii. 33, t. 2; *Dalz. & Gibs. Bomb. Flor.* 29. Bergera nitida, *Thwaites Enum.* 46.

WESTERN PENINSULA; from the Bombay Ghats, *Dalzell*, to the Anamallay hills, *Beddome*. CEYLON, *Thwaites*.

A shrub or small tree; branchlets slender, pubescent. *Leaves* 4–10 in.; petioles slender, arched, terete, glabrous or puberulous; leaflets 2–4 in., petioled, very oblique, oblong-ovate, elliptic or lanceolate, rarely almost rounded, tip rounded obtuse and notched or acute or acuminate, crenulate, very dark with raised glands on both surfaces when dry.

Panicle peduncled; peduncle hoary, corymbosely branched above. *Flowers* ⅙ in. diam., very shortly pedicelled, pale, glabrous, globose. *Petals* broadly ovate. *Fruit* ½ in. diam., globose, yellow.—Beddome considers this to be probably a variety of *C. Willdenovii*, but the inflorescence is totally different.

** *Inflorescence axillary, panicled or racemose.*

8. **C. Willdenovii,** *W. & A. Prodr.* 96; glabrous or pubescent or tomentose, leaves 5–13-foliolate, leaflets 1–2 in. obliquely ovate or ovate-lanceolate crenulate, flowers in compound slender racemes usually 4-merous, ovary stipitate 4-angled or grooved glabrous, style short thick, ovules 2 superposed in each cell. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 32; *Bedd. For. Sylvat. Anal. Gen.* xliv. t. 7, f. 3; *Dalz. & Gibs. Bomb. Flor.* 30; *Wight Ic.* t. 14; *Thwaites Enum.* 47; *Wall. Cat.* 8509. Cookia dulcis, *Bedd. in Madr. Journ.* 1861; *Trans. Linn. Soc.* xxv. 211. Icica dentata, *DC. Prodr.* ii. 78. Amyris dentata, *Willd. Sp. Pl.* ii. 337.

SIKKIM HIMALAYA, alt. 1–2000 ft. WESTERN PENINSULA, common, ascending to 3000 ft. in Wynaad. CEYLON, in the hot drier parts.—DISTRIB. Moluccas.

A large shrub (*Roxburgh*), glabrous or with the young parts and sometimes the petioles and inflorescence pubescent; branchlets slender. *Leaves* 6–16 in.; petiole slender, terete; leaflets petioled, oblique, oblong-ovate or ovate-lanceolate, obtuse, acute or obtusely caudate acuminate, crenulate, membranous. *Racemes* slender, axillary, 3–10 in. long, branches or pedicels divaricating. *Flowers* fragrant, rather remote, ⅓ in. diam., whitish; buds globose. *Petals* oblong, concave, glandular. *Fruit* globose, from the size of a pea to a cherry, whitish-green, pellucid.

VAR. 1. *pubescens;* more or less pubescent or tomentose or woolly on the young bracts petioles and inflorescence or throughout. C. pubescens, *W. & A. Prodr.* 96; *Wall. Cat.* 8510.—Pegu, Madras, Ceylon.

VAR. 2. *nana;* branches petioles and racemes quite glabrous with scattered pustular glands, leaflets smaller membranous reticulate. C. nana, *W. & A. l.c.; Wall. Cat.* 8507. Amyris nana, *Roxb. Fl. Ind.* ii. 249. Madras (Moluccas, *Roxburgh*).

9. **C. suffruticosa,** *W. & A. Prodr.* 96; softly tomentose, leaves 11–17-foliolate, leaflets 3–5 in. obliquely oblong or ovate-oblong, flowers in compound slender racemes 4-merous, ovary stipitate ovoid or subspherical or grooved, style slender, ovules superposed in each cell. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 33; *Wall. Cat.* 8513, 8514. Amyris suffruticosa, *Roxb. Fl. Ind.* ii. 250.

CHITTAGONG, *Roxburgh;* KHASIA MTS., *De Silva.*

Shrubby, wholly clothed with soft spreading tomentum; stem simple; branchlets about as thick as a goose-quill. *Leaves* 1 ft.; petiole straight, slender, terete, glandular towards the base; leaflets shortly petioled, obtuse acute or acuminate, often equally tomentose on both surfaces, quite entire. *Racemes* 2–5 in., compound, slender, glandular. *Flowers* ¼ in. diam., greenish-white, pedicels slender; buds globose. *Petals* glabrous, concave. *Fruit* (according to Roxburgh) 1 in. long, fusiform or ovoid, drooping, orange-yellow, glandular. *Seed* solitary, green.—Distinguished from var. *pubescens* of Willdenow by the much larger size of leaves leaflets and fruit.

16. TRIPHASIA, Lour.

A spiny shrub. *Leaves* alternate, sessile, 3-foliolate, leaflets obtuse, crenate, lateral smaller. *Flowers* solitary, or in 3-flowered cymes, axillary, sweet-scented. *Calyx* 3-lobed. *Petals* 3, free, imbricate. *Stamens* 6 inserted round a fleshy disk, filaments free subequal dilated at the base: anther linear. *Ovary* ovoid, 3-celled, narrowed into a slender deciduous style, stigma obtuse or capitate and 3-lobed; ovules solitary in each cell *Berry* small, ovoid, 1–3-celled, 1–3-seeded. *Seeds* oblong, immersed i mucilage, testa coriaceous; cotyledons plano-convex, often unequal or lobed.

1. **T. trifoliata,** *DC. Prodr.* i. 536; *Oliv. Journ. Linn. Soc.* v. *Suppl.* ii. 26; *W. & A. Prodr.* 91; *Dalz. & Gibs. Bomb. Fl. Suppl.* 12. T. aurantiola, *Lour.; Wall. Cat.* 6381. Limonia trifoliata, *Linn.; Burm. Fl. Ind.* t. 35, f. 1. L. diacantha, *DC. Prodr.* i. 536.

Western Peninsula, apparently common, but said to be an escape; common in gardens throughout India and in various tropical countries.

A glabrous spinous shrub, with straggling evergreen branches and leaves; spines slender, straight. *Leaflets* thick and soft, crenulate, coriaceous, almost nerveless, the terminal shortly petioled, ¾–1½ in., ovate with a cuneate base and rounded notched tip; lateral smaller, more rounded, oblique. *Flowers* very shortly peduncled, nearly ½ in. long, white, fragrant. *Petals* linear-oblong. *Fruit* ½ in. long, fleshy, apiculate, gland-dotted.—Graham (Cat. Bomb. Pl. 23) is probably mistaken in supposing that this, which is considered by many to be a Chinese plant, is a native of the Southern Concan. I am not aware, however, that it has anywhere been found in an indigenous state.

17. **LIMONIA,** Linn.

Shrubs or small trees, often spiny. *Leaves* alternate, 3-foliolate or imparipinnate; leaflets opposite or alternate; petiole winged. *Flowers* panicled, racemed or fascicled. *Calyx* equally 4–5-lobed or -partite. *Petals* 4–5, imbricate. *Stamens* 8–10, inserted around an annular or elevated disk, filaments subulate; anthers cordate or linear-oblong. *Ovary* oblong, 4-5-celled; style short, stout, deciduous, stigma obtuse or capitate; ovules 1-2 in each cell. *Berry* globose, 1–4-celled, 1–4-seeded. *Seeds* imbedded in mucilage; cotyledons fleshy.—Distrib. Species 2–3, natives of Tropical Asia.

* *Cells of the ovary* 1-*ovuled.*

1. **L. acidissima,** *Linn.; DC. Prodr.* i. 536; spinous, glabrous, leaves pinnate, leaflets 2–4 pair sessile opposite obtuse crenulate, rachis broadly winged, racemes subumbellate, flowers 4-merous. *W. & A. Prodr.* 92; *Grah. Cat. Bomb. Pl.* 23; *Dalz. & Gibs. Bomb. Fl.* 29; *Bedd. For. Flor. Anal. Gen.* xlv. L. crenulata, *Roxb. Cor. Pl.* t. 86; *Fl. Ind.* ii. 381; *DC. l.c.; Wall. Cat.* 6364. Hesperethusa acidissima, crenulata *and* ambigua, *Roem. Synops. fasc.* i. 38.—*Rheede Hort. Mal.* iv. t. 14.

Dry hills in various parts of India, N.W. Himalaya in Simla and Kumaon, ascending to 4000 ft.; Monghyr hills in Behar; Assam; Western Peninsula, from the Bombay Ghats and Coromandel southwards. Yunan, *J. Anderson.*

A spinous glabrous shrub or small tree, with rigid flexuous woody branches; spines ½-1 in. *Leaves* 1–4 in. long; petiole and rachis jointed, the former narrowly the latter very broadly winged; leaflets 1–2 in., trapezoid-ovate, obtuse and notched at the tip, base cuneate, margins crenulate, nerves slender reticulate; joints of rachis obovate-oblong, crenulate. *Racemes* 1 in. long, pubescent, often leafy; pedicels slender. *Flowers* ¼ in. diam., tetramerous, white, fragrant. *Sepals* small. *Petals* elliptic or oblong. *Disk* annular or columnar. *Ovary* 4-celled, style short thick; ovule 1 pendulous in each cell. *Berry* globose, ½ in. diam., 1–4-seeded, very acid.

?2. **L. pubescens,** *Wall. Cat.* 6365 (Limonia?); spinous, leaflets 3-5-pair opposite broadly rhomboid or ovate obtuse quite entire or sinuate-crenate midrib beneath and winged costa pubescent.

Birma; at Taong-dong, *Wallich.*

The specimen in Wallich's Herbarium is very incomplete, and the detached fruit which accompanies it is probably that of another plant. *Branches* woody, with short strong scattered thorns, branchlets unarmed. *Leaves* 3–5 in., leaflets 1½–2 in., sessile, base cuneate; rachis between the leaflets 1/10 in. broad.—? *Fruit* a depressed sphere ½ in. diam., 5-lobed, smooth.

3. **L. alternans,** *Wall. in Voigt. Hort. Calc.* 139; unarmed, leaves pinnate, leaflets 5–7 pairs alternate acuminate crenulate, rachis narrowly winged, cymes subsessile, flowers 5-merous. *Kurz in Journ. As. Soc. Beng.* 1873, ii. 64 (*L. alternifolia*).

PEGU, *Wallich, Kurz;* TENASSERIM, at Mergui, *Griffith.*

A slender shrub, with a simple or sparingly branched stem, quite glabrous. *Leaves* 4–9 in.; petiole hardly winged; rachis narrowly winged; leaflets 1½–2 in., ovate, sessile, terminal much larger, nerves obscure. *Cymes* short and shortly peduncled, axillary, glabrous. *Flowers* small, white. *Sepals* minute, acute. *Petals* ¼ in. long, subacute. *Stamens* 10, the alternate longer, filaments sparsely pubescent within. *Disk* thick, elongate after flowering. *Ovary* obovoid, compressed, smooth, 2-celled; ovules solitary, pendulous; style curved, stigma thickened.—The description of the flower is from Kurz, who retains it in this genus.

** *Cells of ovary 2-ovuled.*

4. **L. alata,** *W. & A. Prodr.* 92; usually spinous, leaves 3-foliolate, leaflets obovate quite entire, the lateral small, flowers 4–5-merous. *Wight Ill.* i. t. 41; *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 27; *Wall. Cat.* 6363; *Thwaites Enum.* 45; *Bedd. Flor. Sylv. Anal. Gen.* xlv. t. 7, f. 4.

WESTERN PENINSULA; foot of the Nilghiri and Anamallay Mts. and elsewhere in the Madras Presidency, *Wight, Maingay;* CEYLON, common in hot dry parts of the Island.

A small glabrous tree; spines 1 in., nearly straight. *Leaves* 2–4 in.; leaflets 1–2½ in., subsessile, base cuneate; petiole 1–1½ in., winged. *Panicles* 2–3 in., terminal and axillary, few- or many-flowered, hoary, branches rather stout. *Flowers* ½ in. diam., shortly pedicelled, ebracteolate. *Sepals* triangular. *Petals* oblong. *Stamens* subequal. *Disk* small, annular. *Ovary* 4–5-celled; style rather slender, stigma capitate; ovules collateral or obliquely superposed. *Berry* 1 in. diam., globose, many-seeded.

DOUBTFUL AND EXCLUDED SPECIES.

LIMONIA BILOCULARIS, *Roxb. Fl. Ind.* ii. 377. Atalantia? bilocularis, *Wall. Cat.* 6356. Sclerostylis atalantioides, *W. & A. Prodr.* 93, *not of Wight Ic.* 71; Helie atalantioides, *Roem. Synops. fasc.* 42. A. buxifolia, *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 26.—A Chinese plant, erroneously supposed to have been introduced into the Calcutta Botanic Garden from Coromandel by Dr. Berry.

L.? FLAVICANS, *Wall. Herb.*, from Taong-dong in Ava, a plant without flower or fruit, is not Aurantiaceous, but I cannot tell what it is.

L. OBLONGA, *Wall. Cat.* 6359; an imperfect specimen without flower or fruit, may be *Paramignya Griffithii.* The leaves are 3–5 in., oblong-lanceolate, obtusely acuminate, and as well as the slender branchlets finely pubescent beneath; spines short.

L. PENTAGYNA, *Roxb.*, is *Bursera serrata,* Wall., according to Kurz in Journ. As. Soc. Bengal, 1870, pt. 2, 70.

L. RETUSA, *Don Prodr.* 224, is probably *Triphasia trifoliata.*

18. **LUVUNGA,** Hamilt.

Glabrous, climbing shrubs, usually armed with axillary spines. *Leaves* 3-foliolate; leaflets coriaceous quite entire. *Flowers* in axillary fascicled or panicled racemes. *Calyx* cupular, entire or obscurely 4–6-lobed. *Petals* 4–5, free, linear-oblong, thick, imbricate. *Stamens* 8 or 10, inserted around a cupular annular or elevated disk; filaments equal or not, linear-subulate, free or cuneate; anther linear or linear-oblong. *Ovary* 2–4-celled; style stout, deciduous, stigma capitate; ovules 2 superposed in each cell. *Berry* large, ellipsoid, with a thick rind, 2–3-seeded. *Seeds* large, ovoid, testa membranous, nerved; cotyledons equal, oblong, fleshy.—DISTRIB. About 4 species tropical Asiatic.

1. **L. scandens,** *Ham. in Wall. Cat.* 6382; leaflets 5–12 in. oblong elliptic-oblong or lanceolate or oblanceolate tip rounded acute or acuminate, filaments more or less cuneate. *Wight Ill.* i. 108; *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 43; *Bot. Mag.* t. 4522. Limonia scandens, *Roxb. Fl. Ind.* ii. 380.

EASTERN BENGAL, ASSAM, the KHASIA MTS., BIRMA, and MALACCA.

A strong scandent annual glabrous shrub, with woody flexuous branches, and recurved spines. *Leaves* very variable, thickly coriaceous; petiole 2–5 in., stout, cylindric; leaflets smooth, shortly petioled, nerves very faint, spreading. *Cymes* panicled or subracemose, short, shortly peduncled, few-flowered. *Flowers* about ¾ in. diam., very fragrant, white. *Calyx* with the margin truncate and lobed more or less. *Petals* 4, fleshy, recurved. *Stamens* with the filaments sometimes united almost to the top. *Ovary* 3–4-celled. *Berry* oblong, size of a pigeon's egg, yellowish, obscurely 3-lobed, rind smooth, pulp resinous-odoriferous. *Seeds* 1–3, ovoid, pointed.—The description of the fruit is from Roxburgh. Malacca specimens have much broader and more obtuse leaves than the Silhet and Assam ones. Beddome (*Flor. Sylv. Anal. Gen.* xlvii. *in note*) says that this, as well as the following, is abundant in the Western side of the Madras Presidency, but I have seen no specimens from thence.

2. **L. eleutherandra,** *Dalz. in Hook. Kew Journ. Bot.* ii. 258; leaflets 3–5 in. elliptic or obovate abruptly obtusely acuminate, filaments free. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 44; *Dalz. & Gibs. Bomb. Flor.* 30. L. Tavoyana, *Lindl. in Wall. Cat.* 6383. L. scandens *and* eleutherandra, *Thwaites Enum.* 47, 48, 406. ? Triphasia sarmentosa, *Blume Bijd.* i. 132. X

WESTERN PENINSULA, in forests from the Concan southwards; CEYLON, alt. 3–5000 ft., *Thwaites,* &c.; ? TAVOY, *Gomez.*—DISTRIB. Java.

Perhaps only a variety of *L. scandens,* with smaller leaves and fruit and free stamens.—Kurz (*Journ. As. Soc. Beng.* 1870, ii. 69) doubts Blume's *T. sarmentosa* being this; but there is a Javan specimen so marked in the Herb. that altogether resembles the Indian. Wallich's specimens of *L. Tavoyana* have the leaves even larger than those of *L. scandens.*

19. **PARAMIGNYA,** Wight.

Erect or climbing shrubs, unarmed or with axillary spines. *Leaves* 1-foliolate, the joint often obscure, quite entire, subcoriaceous, persistent. *Flowers* rather large, axillary, solitary or fascicled. *Calyx* cupular or small and 4–5-lobed. *Petals* 4–5, free, imbricate or rarely induplicate-valvate. *Stamens* 8–10, inserted round a columnar disk, filaments free linear equal or subequal; anther linear-oblong. *Ovary* 3–5-celled; style elongate, deciduous; ovules in each cell solitary or 2 obliquely superposed. *Berry* ovoid or subglobose, often contracted at the base, 1–5-seeded, rind thick. *Seeds* large, oblong, much compressed, testa membranous; cotyledons fleshy, equal.—DISTRIB. Species 4, tropical Indian.

Kurz proposes to join this genus with *Atalantia* (Journ. As. Soc. Beng. 1870, ii. 69), observing that the shape of the anthers cannot be important, that *A. missionis* has a columnar disk, and that the habit is the same in both genera. All the species of both genera want a careful study and revision with better materials than I have.

* *Flowers nearly* 1 *in. long. Calyx cupular with broad lobes.*

1. **P. monophylla,** *Wight Ill.* i. 109, t. 42 (Micromelum?); spines recurved, leaflet oblong or elliptic with an abruptly acute tip, flowers 1–4 equalling or exceeding the pedicels, calyx cupular broadly 4–5-lobed, stamens 10–12, ovary-cells 3–5 2-ovuled. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 41.

Sikkim Himalaya, alt. 2–5000 ft., *J. D. H.*; Bhotan, *Booth*; Khasia Mts., alt. 2–4000 ft.; Tenasserim, *Lobb*; Western Peninsula, common; the Western Forests, from the Concan southward; Ceylon.

A stout climbing evergreen shrub, with strong green flexuous woody branches and hooked axillary spines sometimes nearly an inch long; tips of young shoots and petioles often pubescent. *Leaflets* 2½–5 in., usually elliptic and rounded at both ends, rarely somewhat obovate, sometimes elliptic-lanceolate and acute or caudate-acuminate, coriaceous, bright green; nerves numerous, spreading; petiole ½–¾ in. *Flowers* 1 in. diam., white, fragrant. *Petals* linear-oblong, very imbricate. *Filaments* linear, flattened, glabrous and hairy. *Ovary* hairy or glabrous; style glabrous above; ovules rarely solitary. *Berry* ovoid or obovoid, size of a nut or larger, yellow, odour heavy. *Seeds* compressed.

2. **P. grandiflora,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 42; spines short recurved or 0, branches and leaves beneath pubescent, leaflet elliptic or ovate-oblong abruptly obtusely acuminate, flowers usually solitary shorter than or equalling the slender pubescent or glabrate pedicel, calyx cupular, filaments villous, ovary-cells 5 usually 2-ovuled. Limonia grandiflora, *Wall. Cat.* 6361.

Tenasserim, at Tavoy, *Wallich*, *Helfer*; Sincapore, *Lobb*.

A small tree (*Wallich*). *Branches* slender, terete, sometimes glabrate. *Leaflets* 2½–4 in., thinly coriaceous, base rounded. *Flowers* 1 in. long, as large as those of *P. monophylla*; pedicel sometimes longer, with a pair of basal bracteoles. *Calyx-lobes* rounded, ciliate. *Petals* linear-oblong.

* *Flowers about* ½ *in. long. Calyx small, with acute teeth.*

3. **P. Griffithii,** *Hook. f.*; spines short, branches and leaves glabrous or pubescent, leaflet elliptic or oblong abruptly obtusely acuminate, flowers 1–3, pedicels very short, calyx acutely 5-lobed, filaments longer than the linear-oblong anthers, ovary-cells 5 2-ovuled. P. citrifolia, *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 42 (*not* Limonia citrifolia, *Roxb.*). Citrus scandens, *Griff. Notul.* iv. 495; *Ic. Pl. Ind. Or.* t. 587, f. 1. ? Limonia oblonga, *Wall. Cat.* 6359; and L. missionis, *Wall. Cat.* 6358 D. & F.

Birma, at the Serpentine Mines and Malacca, *Griffith*; Mukee hills in Assam, *Masters*; Pegu, *M'Lelland*. ? Penang and Silhet, *Wallich*.

Branches and foliage like that of *P. monophylla*, but the flowers are very different, ⅓–¼ in. long, with a small acutely-lobed calyx. *Fruit* unknown.—Griffith's figure is a great exaggeration, as his specimens prove. Wallich's 6358 D and F are referable to this or the following.

4. **P. citrifolia,** *Hook. f.* (*not of Oliver*); glabrous, spines short, leaflet elliptic ovate acute, flowers 1–3, pedicels very short, calyx acutely 5-lobed, filaments much shorter than the linear elongate anther, ovary-cells 5 2-ovuled. Limonia citrifolia, *Roxb. Fl. Ind.* ii. 379.

Chittagong, *Roxburgh*.

Young shoots polished. *Leaflet* 4–5 by 2–3 in., quite entire. *Flowers* white, about ⅓ in. diam. *Petals* oblong. *Filaments* quite free. *Ovary* ovoid-oblong, 5-grooved; style short, thick; stigma subpeltate. *Berry* ovoid, pointed, of the colour and appearance of a *Lime*, even to the little green cells in the cortex. *Seeds* 1–4, separated by a few small dry fibres only which are scarcely to be traced when dry, oblong; testa membranous.—This plant is unknown to me; the description is taken from Roxburgh's Flora Indica and drawings. Prof. Oliver referred to it the preceding species, which differs in the form of the stamens, and (if Roxburgh's figure of the ovary is correct) in wanting a style, but the said figures resemble what an ovary would be were the style fallen away. I refer it to *Paragmignya* from the long anther and pointed fruit. Kurz has pointed out that Oliver's *P. citrifolia* and Griffith's *Citrus scandens* cannot both be the same as Roxburgh's *Limonia citrifolia* (Journ. As. Soc. Beng. 1870, Pt. 2, 69).

5. **P. longispina,** *Hook. f.*; glabrous, spines long straight, leaflet oblong subacute, flowers solitary small, pedicel very short, calyx 5-toothed, filaments short equalling the linear anthers, ovary-cells 3–4 4-ovuled, fruit 3–4-angled.

MALACCA, *Maingay.*

Branches stout; spines opposite and alternate, straight, sometimes 2 in. long. *Leaflet* 3–4 in., base cordate; petiole very short. *Flowers* ⅓ in. long; pedicel very short. *Calyx-lobes* obtuse. *Petals* oblong, obtuse. *Stamens* 10, equal, glabrous; anthers as long as the filaments, narrow, with a long apiculus. *Ovary* glabrous, stipitate; style stout, cylindric; ovules superposed in pairs. *Fruit* 1–1¼ in. long, between globose and ovoid, pointed, 3–4-celled; rind thick, coriaceous, glandular, pulp 0. *Seeds* 2–4 in each cell, oblong, compressed, narrowed at the base into a short beak.—This description is mainly taken from Maingay's notes.

6. **P. armata,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 43; glabrous, spines straight or recurved, leaflet elliptic or elliptic-lanceolate obtusely caudate-acuminate, flowers small solitary or fascicled, pedicel very slender, calyx obtusely 4–5-lobed, ovary-cells 3–4 usually 1-ovuled. Arthromischus armatus, *Thwaites Enum.* 47.

CEYLON; in the hotter parts of the Island, common.

A scandent shrub; branches stout or slender, straight or flexuous. *Leaflet* 2–3 in., base rounded, nerves indistinct; petiole exceedingly short. *Flowers* ¼ in. long, 4–5-merous; pedicels ½ in.; buds obovoid. *Calyx* minute. *Petals* oblong, very much imbricated. *Filaments* linear-subulate, pilose; anthers linear-oblong. *Ovary* hairy; style long, cylindric, stigma dilated. *Fruit* ½–¾ in. diam., subglobose, pulpy, yellow, 1–4-seeded.

20. **ATALANTIA,** Correa.

Unarmed or spinous shrubs or trees. *Leaves* alternate, 1-foliolate, coriaceous, persistent, quite entire or crenulate; stipule-like scales are often present at the base of the petioles and spines, which belong to undeveloped leaf-buds. *Flowers* axillary rarely terminal, fascicled or in short racemed corymbs or panicles, rarely solitary. *Calyx* 3–5-lobed or -partite, rarely irregularly split. *Petals* 3–5, free or adnate to the stamens and united with them into a tube, imbricate. *Stamens* 6–8, rarely 15–20, inserted round an annular or cupular disk, filaments free or irregularly connate subequal or the alternate shorter; anthers short, ovate-oblong or base cordate (linear-oblong in *A. missionis*). *Ovary* 2- or 4- rarely 3- or 5-celled; style deciduous, stigma capitate; ovules solitary or 2 collateral in each cell. *Berry* large, subglobose, 1–5-celled, 1–5-seeded, rind thick. *Seeds* oblong; cotyledons fleshy, plano-convex. — DISTRIB. Species about 10, tropical Asiatic and 1 Australian.

* *Anthers* broadly ovoid. *Ovary* sessile on a short disk; stigma clavate.

† *Calyx irregularly lobed, split to the base on one side.*

1. **A. monophylla,** *Correa; DC. Prodr.* i. 535; leaflet elliptic or ovate-oblong, tip obtuse or 2-lobed, flowers fascicled or shortly racemed,

calyx in flower or after it irregularly split to the base, margin erose scarious, filaments monadelphous, ovary usually 4-celled, ovules 1 or 2. *W. & A. Prodr.* 91; *Wight Ill.* i. 108; *Wall. Cat.* 6353; *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 24; *Dalz. & Gibs. Bomb. Flor.* 28; *Bedd. Flor. Sylv. Anal. Gen.* xlvi. t. 7, f. 5. A. floribunda, *Wight. Ic.* t. 1611. A. platystigma, *Wight Ill.* i. 108. Limonia monophylla, *Linn.; Roxb. Cor. Pl.* i. t. 82; *Fl. Ind.* ii. 378. Turræa virens, *Hellen. in Act. Holm.* 1788, t. 10, f. i. (*not of Linn.*). Trichilia spinosa, *Willd.; DC. Prodr.* i. 623.—*Rheede Hort. Mal.* iv. t. 12; *Burm. Fl. Zeyl.* t. 65, f. i.

SILHET, at the foot of the Khasia Mts., *H. f. & T.*; throughout the WESTERN PENINSULA, from the Concan and Coromandel southwards; CEYLON, not uncommon towards the N. of the Island.

A large glabrous shrub or small tree, with rigid flexuous woody branches (the tips often pubescent), and usually strong axillary single spines. *Leaflet* 1–3 in., ovate-oblong or elliptic, obtuse, notched or 2-lobed at the tip, coriaceous, bright green, quite entire; petiole very short, often pubescent, stipular scales subulate. *Flowers* $\frac{1}{3}$–$\frac{1}{2}$ in. diam., always fascicled in the leaf-axils, pubescent; pedicels $\frac{1}{4}$–$\frac{1}{2}$ in., minutely bracteolate; buds subglobose or pyriform. *Calyx* rupturing irregularly. *Petals* obovate-oblong, obtuse. *Filaments* 8, rarely 5–7, connate into an irregularly cleft tube, which is antheriferous at the top; anthers broadly ovoid. *Ovary* sessile on a small disk, 3–5-celled. *Berry* as large as a nutmeg, globose, like a lime, usually 4-celled; cells 1-seeded.—Roxburgh describes the flowers, as shortly racemose, and calyx as 4–5-parted, which does not agree with our specimens from the Peninsula.

VAR. *macrophylla*, Oliv. l.c.; leaves larger and broader, flowers racemose, pedicels stout compressed (flowers not seen).—Tenasserim, *Helfer*.

VAR. *carissoides*, Oliv. l.c.; leaves ovate or ovate-lanceolate, pedicels longer hairy. A. carissoides, *Wall. Cat.* 6354.—Segaen on the Irrawaddy, *Wallich*.

†† *Calyx regularly or subregularly* 4–5-*lobed*.

2. **A. racemosa,** *W. & A. Prodr.* 91; leaflet oblong elliptic or ovate oblong, lip obtuse or 2-lobed, flowers racemed rarely fascicled, racemes pubescent or glabrous, calyx 4-lobed, lobes acute or obtuse, filaments more or less connate, ovary 2–3-celled, ovules 2 collateral. *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 24; *Bedd. Flor. Sylv. Anal. Gen.* xlvi. A. capitellata, *Lindl. in Wall Cat.* 6355. Sclerostylis racemosa, parvifolia *and* ovalifolia, *Wight Ill.* i. 109. S. atalantioides, *Wight Ic.* 71. Lampetia (*not of W. & A. Prodr.*) racemosa, *Roem. Synops.* fasc. i. 42? Limonia ? missionis. *Wall. Cat.* 6358 E.

WESTERN PENINSULA; from the Concan to Travancor; CEYLON, at Galagame, *Gardner*.

A small tree, armed or unarmed, very similar to *A. monophylla*, but the flowers, instead of being long pedicelled in short racemes or fascicles, are shortly pedicelled on racemes sometimes 3 in. long, but at others almost reduced to corymbs; the leaves are usually larger, and often broader, though quite small in Wight's figure; the flowers are of the same size, but often very crowded and the buds very globose, they are usually 4- but sometimes 3–5-merous, and the filaments are free or variously united; the ovary is sessile on a small disk.—The great distinction between these species is in the more or less regularly 4- (3–5-) lobed calyx of this, the lobes of which are acute or obtuse. *Fruit* globose, $\frac{3}{4}$ in. diam. One of Wight's specimens has ovate leaves, cordate at the base. Wallich's 6358 E, from Penang (G. Porter), in fruit only, with leaves cordate at the base, may be this or the following, or something different from both.

3. **A. ceylanica,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 25; leaflet obtuse notched or 2-lobed rarely obtusely acuminate, flowers very shortly racemed, calyx 4-lobed, filaments free or 2 or 3 of them more or less combined, ovary 2-celled, ovules 2 collateral. *Thwaites Enum.* 405; *Bedd. Flor. Sylvat. Anal. Gen.* xlvi. Rissoa zeylanica, *Arn. in Act. Acad. Nat.*

Cur. xviii. 324. Sclerostylis zeylanica, *Wight Ill.* i. 109; *Thwaites Enum.* 46. S. Arnottiana, *Wight Ill. l.c.*

WESTERN PENINSULA; Phoondah Ghat, in the Concan, *Ritchie;* Nilghiris, *Beddome;* CEYLON, common in the warmer parts of the island; ? MALACCA, *Griffith.*

A bush or small tree, unarmed or armed with very straight spines, ¼–1 in. long. *Leaflet* extremely variable, 1–7 in., elliptic-oblong ovate-oblong obovate or almost lanceolate, simply obtuse or with an emarginate or 2-lobed tip. *Racemes* rarely exceeding ¾ in. *Flowers* quite similar to those of *A. racemosa,* and on equally short pedicels; buds globose. *Ovary* sunk in the annular disk.—The Malacca specimens have no flowers, the leaf is 5–6 in., elliptic-lanceolate, more attenuate at the obtuse entire tip, and the globose fruit ⅔ in. diam. when dry.

VAR. *rotundifolia,* Oliv. l.c.; Thwaites, Enum. 405; leaves rounded or obovate or even obcordate. Sclerostylis rotundifolia, *Thwaites, l.c.* 46.—Ceylon, at Maturatte, alt. 4000 ft. and upwards, *Thwaites.*

4. **A. caudata,** *Hook. f.;* leaflet elliptic-lanceolate caudate-acuminate with a broad 2-lobed tip, flowers small in very short glabrous racemes, calyx very small 4–5-lobed, ovary 2-celled, ovules 2 collateral. A. Roxburghiana, *Oliv. in Journ. Linn. Soc.* v. *Suppl.* ii. 25. Limonia? caudata, *Wall. mss. in Herb. Hook.*

KHASIA MTS., at Churra, alt. 4000 ft., *H. f. & T.* (Hort. Bot. Calc. *Wallich*).

A glabrous unarmed shrub, with slender branches. *Leaflet* 3–4 in., much narrower and more narrowed at each end than in any congener, margin quite entire, tip sometimes dilated. *Racemes* ½ in., peduncles and pedicels much more slender than in its congeners. *Flowers* ¼–⅓ in. diam., white, fragrant, usually 4-merous, buds rather longer than broad. *Calyx* very small. *Petals* obovate-oblong. *Stamens* quite free; anthers ovoid. *Ovary* sessile on a disk narrower than itself; stigma subcapitate.—A very distinct species, distributed as *S. Roxburghiana?* by T. Thomson and myself.

5. **A. Roxburghiana,** *Hook. f.* (*not of Oliver*); leaflet elliptic-lanceolate acute, racemes axillary short few-flowered, calyx 4-lobed, filaments free, ovary 2-celled. Amyris simplicifolia, *Roxb. Fl. Ind.* ii. 244. Sclerostylis Roxburghii *Wight Ic.* t. 72.

PENANG, *Roxburgh;* ? MALACCA, *Griffith.*

Branches slender, apparently without spines. *Leaflet* 4–5 in., narrowed at both ends, subacute, nerved exactly as in all its congeners (except *L. missionis*); petiole ¼ in. *Racemes* 1 in., 5–6-flowered. *Flowers* nearly ½ in. diam., buds globose. *Calyx* obtusely 4-lobed. *Petals* obovate. *Filaments* free short subulate; anthers ovoid-oblong. *Ovary* ovoid, apparently sessile; the disk not being represented in Roxburgh's drawing tapering into a toothed stigma (probably incorrectly figured); cells with 2 collateral, ovules in each. *Berry* (in Griffith's specimen) globose, ⅔ in. diam. when dry.—A very little known plant, of which there is a figure amongst Roxburgh's drawings (copied by Wight in his Icones), and with which I provisionally identify a fruiting specimen of a Malacca plant collected by Griffith.

** *Anthers* linear-oblong. *Ovary* stipitate.

6. **A. missionis,** *Oliv. in Journ. Linn. Soc.* v. *Suppl.* 25; leaflet oblong-obovate or elliptic opaque margin undulate when dry articulation obsolete nerves very obscure, racemes very short, calyx 4–5-lobed, ovary usually 4-celled, stigma capitate, ovules 2 collateral. *Bedd. Flor. Sylvat. Anal. Gen.* xlvi. Limonia missionis, *Wight in Hook. Bot. Misc.* iii. 291; *Suppl.* t. xxxiii; *Ic.* t. 175; *W. & A. Prodr.* 92. L.? missionis, *Wall. Cat.* 6358, A, B, C. Chilocalyx ellipticus, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, 588.

WESTERN PENINSULA; Redhills, Madras, and other places on both sides of the Presidency. CEYLON, in the hotter parts.

A small tree, head bushy; branches green, terete, the old with long sharp thorns, the young with two axillary ones. *Leaflet* 2–4 in., very thick and coriaceous, tip rounded, margin sometimes crenulate, both surfaces alike and of a very opaque and ashy green when dry, with a few very obscure horizontal nerves not reticulated like the other species, green mottled with white when fresh; petiole ¼–½ in., with no trace of articulation. *Racemes* ¾–1½ in., glabrous, 6–8-flowered. *Flowers* pure white, ½–¾ in. diam., buds globose. *Calyx* very small, lobes acute. *Petals* obovate. *Filaments* slender, quite free; anthers obtuse. *Ovary* 4–5-celled, narrowed at the base, crowning the disk; style cylindric. *Berry* globose, upwards of 1 in. diam., 4–5-celled; cells 1-seeded, full of glutinous fluid. *Seeds* oblong.—A very distinct and curious species, the texture and nervation of the leaf differ wholly from its congeners, and resemble those of *Triphasia.* Wight (from whom most of the above description is taken) states that the ovarian cells have several ovules, but this is certainly an error.

EXCLUDED SPECIES.

A.? BILOCULARIS, *Wall. Cat.* 6356 (see after *Limonia*).

21. **CITRUS,** Linn.

Shrubs or trees, usually spinous. *Leaves* alternate, 1-foliolate, coriaceous, persistent; petiole often winged. *Flowers* axillary, solitary fascicled or in small cymes, white or pinkish, sweet-scented. *Calyx* cupular or urceolate, 3–5-fid. *Petals* 4–8, linear-oblong, thick, imbricate. *Stamens* 20–60, inserted round a large cupular or annular disk; filaments variously connate, compressed at the base; anthers oblong. *Ovary* ∞-celled; style stout deciduous, stigma capitate; ovules 4–8, 2-seriate in each cell. *Berry* large, oblong or globose, fleshy, many-celled, septa membranous, cells few-seeded and filled with horizontal fusiform cells distended with juice. *Seeds* horizontal or pendulous, testa coriaceous or membranous; embryo sometimes 2 or more in one seed, cotyledons plano-convex, often unequal, radicle small, superior.—DISTRIB. About 5 tropical Asiatic species, and 2 Australian.

C. japonica, Thunb. (C. inermis, *Roxb. Fl. Ind.* iii. 393), the Kumquat, is not cultivated in India. I have followed Dr. Brandis's excellent work closely in regard to the forms of this difficult genus.

1. **C. medica,** *Linn.*; young shoots glabrous purple, leaflet glabrous, flowers often unisexual, petals generally more or less pink, fruit globose ovoid or oblong often mamillate at the apex.

Valleys along the foot of the HIMALAYA from GARWHAL to SIKKIM, ascending to 4000 ft.; the KHASIA MTS.; GARROW MTS., *Roxburgh*; CHITTAGONG, *H. f. & T.*; and the WESTERN GHATS and Satpura range in CENTRAL INDIA.

A shrub or small tree, flowering and fruiting at most seasons, growing where I found it on steep hill sides (in Sikkim). *Leaflet* 3–6 in., elliptic-ovate or ovate-lanceolate; petiole naked or winged. *Flowers* 5–10 in a raceme, small or middle-sized. *Stamens* 20–40.—The following are the principal varieties, of which I have found one truly wild in Sikkim, with an oblong leaflet 4 in. long, margined petiole, pink flowers 1 in. long, narrowly ellipsoid, rough fruit 7 in. long, of which the upper 2 in. are contracted into a long conical mamilla, the rind is very thick, and pulp pale yellow. The petals pass into stamens, which would suggest its not being indigenous, but I did not doubt its being so when I gathered it, mainly on dry sunny slopes totally unsuited for any kind of cultivation, where it formed large bushes.

VAR. 1. *medica proper*; leaflet oblong, petiole short margined or not, flowers usually numerous, fruit large oblong or obovoid, mamilla obtuse, rind usually warted thick tender aromatic, pulp scanty subacid. *Brandis For. Flor.* 52. C. Aurantium *var.* medica, *W. & A. Prodr.* 98. C. medica, *Linn.*; *Wall. Cat.* 6387; *Dalz. & Gibs. Bomb. Fl. Suppl.* 13.—The Citron.

VAR. 2. *Limonum;* leaflet ovate, petiole margined or winged, fruit middle-sized ovoid yellow mamillate, rind thin, pulp abundant acid. *Brandis, l.c.* 52. C. Aurantium *var.* Limonum, *W. & A. Prodr.* 98. C. Limonum, *Wall. Cat.* 6389; *Dalz. & Gibs. Bomb. Fl. Suppl.* 13. C. medica, *Willd. according to Roxburgh Fl. Ind.* iii. 392. —The Lemon.

VAR. 3. *acida;* leaflet elliptic-oblong, petiole many-times shorter than the leaflet linear or obovate, racemes short, flowers small, petals usually 4, fruit usually small globose or ovoid, with a thick or thin rind, pulp pale sharply acid. *Brandis, l.c.* 52. C. acida, *Roxb. Fl. Ind.* iii. 390 (who includes under this the varieties, if not species, of Sour Limes and Lemons found in India). The large fruited states of this appear to assume the form of the Citron, and the small to approach the W. Indian Lime, which is, however, described as a bush with white flowers.—The Sour Lime of India.

VAR. 4. *Limetta;* leaves and flowers as in var. *acida*, fruit globose 3–5 in. diam., rind thin smooth, juice abundant sweet not aromatic, *Brandis, l.c.* 52. C. Aurantium *vars.* Limetta *and* Lumia, *W. & A. Prodr.* 98. C. Limetta, *Risso; Dalz. & Gibs. Bomb. Fl. Suppl.* 13; *Wight Ic.* t. 958; *Wall. Cat.* 6385.—This includes 2 of Wight & Arnott's varieties, viz., (1) *C. Limetta*, Risso (Sweet Lime), with winged or margined petioles, small white flowers, globose or ovoid mamillate fruit, and a rind with concave vesicles. *C. Limetta*, DC.; Wall. Cat. 6385. *C. Limonellus*, Wall. Cat. 6386? (2) *C. Lumia*, Risso (Sweet Lemon), with a simply margined petiole, flowers tinged with red, ovoid-oblong fruit with a long mamilla, and rind with convex vesicles.—Wight says that his *C. Limetta* is certainly indigenous at Kolagbery in the Nilghiris.—The Sweet Lime of India.

2. **C. Aurantium,** *Linn.;* arboreous rarely shrubby, young shoots glabrous greenish white, leaflet elliptic or ovate acute obtuse or acuminate, petiole often broadly winged, flowers pure white bisexual, fruit globose generally oblate not mamillate.

Hot valleys along the foot of the HIMALAYA, from Garwhal eastwards to Sikkim, and in the KHASIA MTS.

A small slender tree, flowering in the rains, and fruiting after them, growing where I have found it in the very bottoms of valleys, and where it did not occur to me to doubt its being indigenous. The fruit was somewhat flattened or nearly globose, about 2 in. diam., high coloured, and uneatable, being (if I remember aright) mawkish and bitter. The following are the principal cultivated varieties:—

VAR. 1. *Aurantium proper;* petiole naked or winged, pulp sweet yellow rarely red. *Brandis, For. Fl.* 53. C. Aurantium, *L.; Roxb. Fl. Ind.* iii. 392; *W. & A. Prodr.*, 97; *Wall. Cat.* 6390; *Dalz. & Gibs. Bomb. Fl. Suppl.* 12. —The Sweet Orange.

VAR. 2. *Bigaradia;* petiole usually winged, flowers larger and more strongly scented, rind very aromatic, pulp bitter. *Brandis, l.c.* 53. C. vulgaris, *Risso; W. & A. Prodr.* 97; *Wall. Cat.* 6384; *Wt. Ic.* t. 957. C. buxifolia, *Poir.*—Wight & Arnott describe its oil vesicles as concave, in contradistinction to *C. Aurantium*, in which they are convex. This variety does not seem to be cultivated in India, except in gardens.—The Bitter or Seville Orange.

VAR. 3. *Bergamia;* flowers small very sweet-scented, fruit globose or pyriform, rind smooth pale-yellow, pulp acidulous with pleasant aroma. *Brandis, l.c.* 54. C. Aurantium, *var.* Bergamia, *W. & A. Prodr.* 98. C. Limetta var., *DC. Prodr.* i. 539. Rarely cultivated in India.—The Bergamotte Orange.

3. **C. Hystrix,** *DC. Prodr.* i. 539; young shoots glabrous, leaflet ovate elliptic or lanceolate equalling or smaller than the very broad petiole, flowers small white, fruit globose or obovoid. *Kurz in Journ. As. Soc. Beng.* xxxix. pt. 2, p. 70. Citrus Papeda, *Miq. Fl. Ind. Bat.* i. pt. 2, 530. C. latipes, *Hook. f. & Thoms. Herb. Ind. Or.* Papeda Rumphii, *Cat. Hort. Bog.* 216.—*Rumph. Herb. Amboin.* ii. t. 26, f. 1 & 3, 27, 28.

KHASIA MTS.; in woods at the Living bridge, Moflong and Myrung, alt. 2–5000 ft.—DISTRIB. Sumatra.

A very little-known plant described by Decandolle from a plant in the Montpellier

Botanic Gardens, without flower or fruit, and of which I have seen dried specimens; as I have also flowering ones from the Mauritius Gardens, all named *C. Hystrix*. Kurz has, no doubt rightly, identified Rumph's figures quoted above with this plant. Distinguished from *C. Aurantium* by the spinous branchlets, large petioles, and small flowers which are 4-petalous. The fruit varies from the size of a walnut to that of a small apple, it has a very thick more or less tubercled rind and insipid or acid pulp. Kurz, probably by a misprint, describes the flowers as 4–5-androus, Miquel says 24-androus; I find in Mauritius specimens about 15 stamens.

4. **C. decumana,** *Linn.*; young shoots pubescent, leaflet large ovate-oblong frequently emarginate pubescent beneath, petiole broadly winged, flowers large white, stamens 16–24, fruit large pale globose or pyriform, rind thick, pulp pale sweet or acrid. *Roxb. Fl. Ind.* iii. 393; *Dalz. & Gibs. Bomb. Fl. Suppl.* 12; *Wall. Cat.* 6388.

Commonly cultivated in INDIA. A native of the Malayan and Polynesian Islands.

A tree, 30–40 ft. *Leaflets* 6–9 in. *Fruit* often very large, pulp yellow pink or crimson, sweet or acrid, vesicles distinct.—Shaddock, Pumelo, Pompelmoes.

22. FERONIA, Gærtn.

A spinous tree. *Leaves* alternate, imparipinnate; leaflets opposite, subsessile, quite entire; petiole winged or not. *Flowers* in terminal or lateral loose panicles or racemes, polygamous. *Calyx* small, flat, 5-toothed, deciduous. *Petals* 5, rarely 4–6, spreading, imbricate. *Stamens* 10–12, a few sometimes imperfect, inserted around a short disk, filaments dilated, sides and front villous, tip subulate; anthers linear-oblong. *Ovary* oblong, 5–6-celled, at length 1-celled; style 0, stigma oblong fusiform deciduous; ovules ∞, crowded in many series upon 5–6 at length parietal placentas. *Fruit* large, globose, 1-celled, ∞-seeded, bark woody rough. *Seeds* buried in pulp, oblong, compressed; cotyledons thick, fleshy, radicle pointing away from the hilum.

1. **F. Elephantum,** *Correa; Roxb. Cor. Pl.* t. 141; *Flor. Ind.* ii. 411; *W. & A. Prodr.* 96; *Wt. Ic.* t. 15; *Dalz. & Gibs. Bomb. Fl.* 30; *Wall. Cat.* 6380; *Brandis For. Flor.* 56. Cratæva Vallanga, *Kœnig mss.*

Throughout India, in dry situations, from the PANJAB eastward and southward to CEYLON; wild or cultivated, ascending to 1500 ft. in the W. Himalayas.

A small deciduous glabrous tree, head ovoid. *Leaves* smelling of aniseed; spines strong straight axillary. *Leaflets* 5–7, cuneate or obovate, tip crenate. *Flowers* ½ in. diam., dull-red, ♂ and ♀ often in the same panicle; peduncle and pedicels pubescent. *Fruit* 2½ in. diam., pulp edible.—The Elephant or Wood-apple.

23. ÆGLE, Correa.

Spinous trees. *Leaves* alternate, 3-foliolate; leaflets membranous, subcrenulate. *Flowers* large, white, in axillary panicles. *Calyx* small, 4–5-toothed, deciduous. *Petals* 4–5, spreading, imbricate. *Stamens* numerous, inserted round an inconspicuous disk, filaments short subulate; anthers elongate, erect. *Ovary* ovoid, axis broad, cells 8–20, peripheral; style short, stigma capitate oblong or fusiform deciduous, ovules numerous 2-seriate. *Fruit* large, globose, ovoid or reniform, 8–15-celled; cells many-seeded, rind woody. *Seeds* numerous, in aromatic pulp, oblong, compressed, testa woolly and mucous.—DISTRIB. Species 2–3, tropical Asiatic and African.

1. **A. Marmelos,** *Correa; Roxb. Cor. Pl.* t. 143; *Fl. Ind.* ii. 579; *W. & A. Prodr.* 96; *Wight Ic.* t. 16; *Beddome Fl. Sylv.* t. 161; *Wall. Cat*

6379; *Dalz. & Gibs. Bomb. Flor.* 31; *Brandis For. Flor.* 57. Feronia pellucida, *Roth. Nov. Sp.* 384. Cratæva Marmelos, *Linn.* C. religiosa, *Ainslie Mat. Med. Ind.* (*fid. Wight*) *not of Vahl.*—*Rheede Hort. Mal.* iii. t. 35.

Throughout INDIA, in dry hilly places, from the Jhelum to Assam and southwards to Travancor; wild or cultivated, ascending to 4000 ft. in the W. Himalaya.

A small deciduous glabrous tree; spines 1 in., straight, strong, axillary. *Leaflets* 3-5, ovate-lanceolate, lateral sessile, terminal long-petioled. *Flowers* 1¼ in. diam., greenish-white, sweet-scented; pedicels and calyx pubescent. *Filaments* sometimes fascicled. *Fruit* 2–5 in. diam., globose oblong or pyriform, rind grey or yellow; pulp sweet, thick, orange-coloured.—A species or variety with oblong fruit is grown in Birma, of which I have seen the fruit only.—The Bael tree.

At p. 363 Dr. Masters has referred *Heritiera attenuata*, Wall. Cat. 1140, to *Rutaceæ* as a species of *Niota*. That genus is however now merged in *Samadera* in *Simarubeæ*. Wallich's plant, of which the specimens are imperfect, may be certainly identified with *Brownlowia lanceolata*, Benth. Steudel, quoting from Wall. Cat. p. 157, the ms. name *Niota? polyandra*, has misread the authority H. Ham. (Herb. Ham.) as W. & A., and has further referred the plant to *Vittmannia*.

ORDER XXXIV. **SIMARUBEÆ.** (By Alfred W. Bennett, F.L.S.)

Trees or shrubs, almost always with bitter bark. *Leaves* alternate, often very large, pinnate or rarely simple; stipules 0 or deciduous. *Inflorescence* axillary, racemose paniculate or cymose, rarely spicate. *Flowers* usually diclinous, regular, and generally small. *Calyx* 3–5-lobed, valvate or imbricate. *Petals* 3–5, very rarely 0, hypogynous, valvate or imbricate. *Disk* annular or elongate, simple or lobed, rarely 0. *Stamens* as many or twice as many as the petals, rarely indefinite, inserted at the base of the disk; filaments free, often with a scale at the base; anthers oblong, usually introrse, 2-celled, dehiscing longitudinally. *Ovary* free, 1–6-celled, usually deeply lobed, less often entire; styles 2–5, free or more or less united, stigmas capitate; ovules usually solitary in each cell, rarely more numerous, raphe ventral, micropyle superior. *Fruit* drupaceous, capsular, or occasionally samaroid, usually of 2–6 distinct carpels. *Seeds* usually solitary, erect or pendulous, albuminous; embryo straight or curved, radicle superior.—DISTRIB. Tropical and subtropical regions of both hemispheres; genera 30; species about 120.

TRIBE I. **Eusimarubeæ.** *Ovary* deeply divided.

Ovules solitary in each cell.
  Stamens twice as many as petals.
    Leaves pinnate; fruit samaroid . . . . 1. AILANTUS.
    Leaves simple; fruit drupaceous, variously winged . . . . 2. SAMADERA.
    Stem spiny; filaments with a scale; fruit baccate . . . . . . 3. HARRISONIA.
  Stamens as many as petals.
    Disk thick, entire; flowers panicled; styles connate . . . . 4. PICRASMA.
    Disk 4-lobed; flowers compoundly cymose; styles nearly free . 5. BRUCEA.
    Disk 0; flowers panicled; styles connate . . . . 6. EURYCOMA.
Ovules 2 in each cell; leaves simple . . . . 7. SURIANA.

TRIBE II. **Picramnieæ.** *Ovary* entire; 2–5-celled.

Ovary 2-celled; leaves simple . . . . 8. IRVINGIA.
Ovary 5-celled; stem spiny; leaves 2-foliolate . . . . 9. BALANITES.

1. **AILANTUS,** Desf.

Lofty trees. *Leaves* very large, alternate, unequally pinnate. *Flowers* small, polygamous, bracteolate, in terminal or axillary panicles. *Calyx* 5-fid; lobes equal, imbricate. *Petals* 5, valvate. *Disk* 10-lobed. *Stamens* 10 (in the hermaphrodite flowers 2–3); filaments short or filiform, without scales. *Ovary* 2–5-partite; styles connate; ovules 1 in each cell, semi-anatropous. *Fruit* of 1–5 1-seeded samaras; wing very large, membranous. *Seed* pendulous, sparingly albuminous.—Distrib. India, China, Australia; species 3–4.

A. glandulosa, *Desf.; DC. Prodr.* ii. 89; leaves pubescent or subglabrous, leaflets very coarsely toothed at the base, filaments elongate. *Brandis For. Flor.* 58.

Northern India, probably introduced.—Distrib. China.

A lofty tree. *Leaves* often exceeding 1 ft.; leaflets very numerous, divided very unequally by the midrib, paler beneath. *Flowers* small, in much-branched panicles. *Filaments* filiform, exserted, several times exceeding the anther. *Fruit* of about 3 membranous linear-oblong samaras, about $1\frac{1}{4}$ by $\frac{1}{3}$ in. *Seed* near the centre of the samara, about $\frac{1}{4}$ by $\frac{1}{10}$ in.

1. **A. excelsa,** *Roxb. Cor. Pl.* i. t. 23; *Fl. Ind.* ii. p. 450; leaves glandular-hairy, leaflets very coarsely toothed, filaments short, samara large red twisted. *DC. Prodr.* ii. 89; *W. & A. Prodr.* 150; *Wight Ill.* i. t. 67; *Grah. Cat. Bomb. Pl.* 37; *Dalz. & Gibs. Bomb. Fl.* 46; *Wall. Cat.* 8481; *Brandis For. Flor.* 58.

N. W. India (probably introduced); Behar, and Western Peninsula.—Distrib. Queensland (var. *imberbiflora*).

A tree 60–80 ft. *Leaves* 1 ft. or more; leaflets very numerous, on long petioles, very unequal at the base. *Flowers* larger than in *A. glandulosa*, on longish pedicels, in large lax often very much-branched panicles. *Petals* ovate-lanceolate, commonly reflexed. *Filaments* half the length of the anther. *Samara* larger than in *A. glandulosa*, 2 in. by $\frac{1}{2}$ in., strongly veined, blunt or pointed at both ends, copper-red, always once or twice twisted at the base.

2. **A. malabarica,** *DC. Prodr.* ii. 89; leaflets almost entire nearly glabrous on long petioles very unequal at the base, filaments filiform, samara large rounded. *W. & A. Prodr.* 150; *Wight Ic.* t. 1604; *Thwaites Enum.* 69; *Grah. Cat. Bomb. Pl.* 37; *Dalz. & Gibs. Bomb. Fl.* 46; *Bedd. Fl. Sylv.* t. 122; *Brandis For. Flor.* 58.—*Rheede Hort. Mal.* vi. t. 15.

Western Peninsula, in Canara, &c.; Ceylon, near Colombo, and district of the Seven Corles.—Distrib. Cochin China.

A lofty tree. *Leaves* very large; leaflets distant, coriaceous, much lighter beneath, the two sides very unequal, margin often thickened and wavy. *Flowers* as in *A. excelsa*, but rather larger, and *filaments* very slender, exserted, many times longer than the anther. *Samara* broadly linear, $2\frac{1}{2}$ by $\frac{3}{4}$ in., reddish, not twisted, rounded at both ends.

2. **SAMADERA,** Gærtn.

Larger or smaller glabrous trees. *Leaves* simple. *Flowers* hermaphrodite, in peduncled axillary or terminal umbels. *Calyx* small, 3–5-partite, imbricate. *Petals* 3–5, much longer than calyx, coriaceous, imbricate. *Disk* large, conical. *Stamens* 8–10, included in the corolla, with a small scale at the base. *Carpels* 4–5, distinct, free; styles free at the base, more or less united above, stigmas acute; ovules solitary, pendulous. *Fruit* of 1–5 large dry compressed 1-seeded drupes, each with a narrow unilateral wing. —Distrib. Tropical Asia and Madagascar. Species 3.

1. **S. indica,** *Gærtn. Frut.* ii. t. 156; leaves elliptic-lanceolate fleshy, umbels many-flowered on very long peduncles equalling the leaves, fruit coriaceous glabrous smooth or slightly reticulated. *Wight Ill.* t. 68; *W. & A. Prodr.* 151; *Grah. Cat. Bomb. Pl.* 37; *Hook. Ic. Plant.* t. 7; *Planch. in Hook. Lond. Journ. Bot.* v. 562; *Thwaites Enum.* 70. Niota pentapetala, *Poir. in Lamk. Dict.* iv. 490; *DC. Prodr.* i. 592. N. tetrapetala, *Lamk. Ill.* t. 299, p. 436; *Poir. in Lamk. Dict.* iv. 490; *Blanc. Flor. Filip. ed.* 2, p. 213; *Wall. Cat.* 6349. N. Lamarckiana, *Blume Bijd.* 251, 260. Vittmannia elliptica, *Vahl Symb.* iii. t. 62. Manungala pendula, *Blanc. Flor. Filip.* p. 306.—*Rheede Hort. Mal.* vi. t. 18.

WESTERN PENINSULA; throughout the S. Concan, and Malabar. CEYLON, not uncommon in the South of the Island.

A small tree, 30–35 ft., with stout branches. *Leaves* 8 by 3 in. or larger, blunt, with short thick petioles. *Flowers* numerous, shortly stalked, in dense umbels. *Calyx* small, thick, ciliated, persistent in fruit. *Petals* narrowly oblong, often apiculate. *Stamens* twice as many as petals; filaments very long, with a scale at the base. *Ovary* usually 4-celled. *Fruit* oval, 1½ by 1 in.—There appears to be no reason for identifying, with Lamk. and DC., this with the Madagascar species.

2. **S. lucida,** *Wall. Cat.* 1062; *and Plant. As. Rar.* ii. t. 168; peduncle of umbel shorter than the leaves, fruit strongly reticulated. *Planch. in Hook. Lond. Journ. Bot.* v. 562. Niota lucida, *Wall. Pl. As. Rar.* ii. t. 168. Vittmannia lucida, *Steud. Nom.*

TENASSERIM, *Wallich*; ANDAMAN ISLDS., *Helfer.*

Very nearly allied to *S. indica*, and perhaps only a variety. *Leaves* a paler green, sometimes larger and with longer petioles. *Umbels* sometimes almost sessile. *Fruit* smaller, pear-shaped, dark-brown, glabrous, with a very narrow wing.

3. HARRISONIA, Brown.

Glabrous spiny shrubs. *Leaves* unequally pinnate or 1-foliolate. *Flowers* hermaphrodite, in bracteate cymes. *Calyx* small, 4–5-fid. *Petals* 4–5, longer than calyx. *Disk* hemispherical. *Stamens* 8–10, with small scales at the base. *Ovary* globose or 4–5-lobed, 4–5-celled; styles connate or distinct at the base; ovules solitary, pendulous. *Fruit* a small globose berry. *Seed* solitary, sparingly albuminous.—DISTRIB. Tropical Asia, Australia, and Africa. Species 3–4.

Oliver (*Flor. Trop. Afr.* i. 311) has shown that the affinities of this genus are rather with this tribe of the Order than with *Picramnieæ*, in which it is usually placed.

1. **H. Bennetii,** *Hook. f. in Gen. Plant.* i. 314; leaflets 5–9 entire or crenate, calyx persistent, filaments glabrous with a hairy scale at the base, styles completely united hairy. Lasiolepis paucijuga *and* multijuga, *Benn. Pl. Jav. Rar.* 202, t. 42. L. Bennetii, *Planch. in Hook. Lond. Journ. Bot.* v. 570.

BIRMA and PEGU, *Griffith*, &c.—DISTRIB. Java, Philippines, Siam, S. China, Africa (?)

A woody shrub, with sharp short recurved spines (stipules?), especially on the lower part of the branches. *Leaflets* ovate, glabrous; rachis broadened and even winged and articulated between the leaflets. *Cymes* terminal, 8–20-flowered. *Calyx*-segments very small. *Petals* lanceolate, glabrous. *Filaments* longer than petals, 5 rather shorter than the other 5. *Berry* formed of 2–5 carpels, surrounded by the persistent calyx.—A specimen in the Hookerian Herbarium from Madura, "Herb. Hort. Bot. Calc. No. 1794," with the leaves 3-foliolate, appears distinct

Kurz (*Andam. Rep. App.* iv.) reports H. Brownii (?) a Philippine species, from "Bird-Nest Cape, observed nowhere else, specimens lost."

4. PICRASMA, Blume.

Trees or shrubs with very bitter properties. *Leaves* very large, unequally pinnate. *Flowers* small, diclinous or polygamous, in axillary panicles. *Calyx* very small, 4–5-toothed. *Petals* 4–5, valvate, very often increasing after flowering. *Disk* thick, entire. *Stamens* 4–5, not scaly, hairy. *Ovary* 3–5-partite, free; styles distinct at the base and apex, but united in the middle, stigmas simple; ovules erect, solitary. *Fruit* of 1–3 fleshy or coriaceous drupes. *Seed* erect, albuminous.—DISTRIB. India, Archipelago, China, Japan, West Indies, Brazil. Species about 6.

1. **P. quassioides,** *Benn. Pl. Jav. Rar.* 198; leaflets numerous obovate acuminate serrate, flowers polygamous in pubescent panicles, calyx-segments petals and stamens 5, petals persistent in female and hermaphrodite flowers, filaments strap-shaped equalling the petals villous. *Planch. in Hook. Lond. Journ. Bot.* v. 573; *Wall. Cat.* 8506. Simaba quassioides, *Ham. in Don Prodr.* 248. Nima quassioides, *Ham. mss.*

Subtropical Himalaya; from JAMU to NIPAL, ascending to 8000 ft. in GARWHAL; BHOTAN, *Griffith.*—DISTRIB. S. China.

A large scrambling shrub, with stout often spotted branches and very bitter bark. *Leaves* a foot or more long, of 9–15 leaflets, the lowest pair much smaller and stipuliform. *Flowers* green. *Calyx*-segments small, imbricate. *Petals* ovate or obovate, much enlarged and coriaceous in fruit. *Fruit* of 3–5 rather membranous drupes, about the size of a pea, each containing 1 erect *seed.*

2. **P. javanica,** *Blume Bijd.* p. 248; leaflets 3–7 elliptic-oblong abruptly obtusely acuminate quite glabrous, margins flat quite entire, tips not above $\frac{1}{6}$–$\frac{1}{4}$ the length of the blade, flowers 4-merous. *Benn. Flor. Jav.* 197, t. 41; *Planch. in Hook. Lond. Journ. Bot.* v. 573.

MALACCA, *Maingay.*—DISTRIB. Java.

A moderate-sized tree, of which there are two forms (or species) in Java—one with elliptic oblong leaflets and a slightly pubescent panicle, and with which the Malacca specimens agree; the other with more obovate leaflets and a glabrous panicle.

VAR.? *mishmiensis;* leaflets 5–9, elliptic oblong more coriaceous, drupes larger, $\frac{1}{3}$ in. diam.—Mishmi hills near Jingsha, *Griffith.*

3. **P. nepalensis,** *Benn. Flor. Jav.* 201; leaflets 5–7 elliptic-lanceolate caudate-acuminate quite glabrous, margins waved or wrinkled quite entire, tips $\frac{1}{4}$–$\frac{1}{3}$ the length of the blade, flowers 4-merous. *Planch. in Hook. Lond. Journ. Bot.* v. 573. Brucea? *Wall. Cat.* 7499. B. dubia, *Steud. Nom.*—Indeterminata, *Wall. Cat.* 9037 (*see under* 8506).

NIPAL, *Wallich;* Khasia Mts., *De Silva, Griffith.*

A smaller and narrower leafleted plant than *P. javanica,* with longer points to the leaves which have wrinkled white edges when dry; the branches of the panicle are more slender and the anthers larger.

4. **P. andamanica,** *Kurz Andam. Rep. App.* iv.; leaflets elliptic-oblong rounded at the base, abruptly obtusely acuminate quite entire, flowers 4-merous, petals glandular.

SOUTH ANDAMAN ISLANDS, *Kurz.*

A tree with very smooth branches, closely resembling *P. javanica. Leaflets* variable in number, 5 by 2½ in., thinner, and scarcely thickened at the margin, much more rounded at the base and often unequilateral. *Panicle* rather lax, perfectly glabrous. One or more of the *petals* of the male flowers with two large glandular dots. *Fruit* unknown.

5. BRUCEA, Mill.

Bitter trees or shrubs. *Leaves* very large, unequally pinnate. *Flowers* very small, in very numerous very small cymes collected into axillary panicles. *Calyx* minute, 4-partite, imbricate. *Petals* 4, minute, linear, imbricate. *Disk* 4-lobed. *Stamens* 4, inserted beneath the disk; filaments naked. *Ovary* deeply 4-lobed, or consisting of 4 entirely free carpels. *Drupes* 4, entirely free, ovoid, somewhat fleshy. *Seed* solitary, exalbuminous.—Distrib. Africa, Tropical Asia, Australia; species 6.

1. **B. sumatrana,** *Roxb. Fl. Ind.* i. 449; leaves very large, leaflets numerous very coarsely toothed villous beneath, panicles very long compound, flowers usually hermaphrodite, filaments short. *DC. Prodr.* ii. 88; *Wall. Cat.* 8482; *Blume Bijd.* 1167.

Assam; Eastern Peninsula; in Tenasserim and the Andaman Islds., *Helfer;* Singapore, *Wallich.*—Distrib. Borneo, Sumatra, Java, Philippines, South China, Australia.

A shrub with bitter and somewhat fœtid properties. *Leaves* often more than a foot long, covered with a dense yellow pubescence, especially on the veins, &c. beneath, the lowest leaflets sometimes compound. *Panicles* axillary; rachis greatly elongated, yellow-pubescent; the minute *flowers* collected into small rather distant stalked cymes. *Calyx* very minute. *Petals* larger than the calyx-segments, linear-spathulate. *Stamens* not exceeding petals in length. *Drupes* $\frac{1}{6}$–$\frac{1}{8}$ in., black, glabrous, reticulated.

2. **B. mollis,** *Wall. Cat.* 8483; leaflets numerous lanceolate-acute entire usually pubescent, racemes compound, drupes ovoid. *Kurz in Journ. As. Soc. Beng.* xlii. pt. ii. p. 64.

Subtropical Eastern Himalaya; Sikkim and Bhotan, alt. 3–6000 ft., *Griffith,* and Silhet, *Wallich.*

A bitter shrub. *Leaflets* larger than in *B. sumatrana*, 3 by 2 in., from pubescent to nearly glabrous. *Panicles* axillary; rachis pubescent or nearly glabrous; secondary cymes often many-flowered. *Petals* linear, longer than the stamens. *Drupes* much larger than in *B. sumatrana*, $\frac{1}{3}$–$\frac{1}{4}$ in., brown, glabrous, scarcely reticulated.

6. EURYCOMA, Jack.

Small trees, with bitter bark. *Leaves* very large, unequally pinnate, with entire leaflets. *Flowers* polygamous, in much-branched subterminal hairy panicles. *Calyx* minute, 5-toothed, valvate. *Petals* 5, induplicate-valvate. *Disk* 0. *Stamens* in male and hermaphrodite flowers 5, smaller in the latter; filaments attached to the base of the petals. *Ovary* 5-partite, free; styles 5, connate, stigmas distinct. *Drupes* 3–5, stipitate. *Seed* solitary, pendulous, exalbuminous.—Distrib. Malacca, Archipelago, Philippines. Species 2.

1. **E. longifolia,** *Jack, Roxb. Fl. Ind. ed. Carey*, ii. 307; leaflets elliptic acute, panicles glandular-hairy, calyx-segments glandular, petals ovate-lanceolate, filaments appendiculate. *DC. Prodr.* ii. 86; *Wall. Cat.* 8522; *Planch. in Hook. Lond. Journ. Bot.* v. 584. E. merguensis, *Planch. l.c.* E. tavoyana, *Wall. Cat.* 8523.

Tenasserim, *Parish*, and the Andaman Islds., *Helfer*, to Malacca, Penang, and Singapore.—Distrib. Sumatra, Borneo, Philippines.

A tree with bitter properties. *Leaves* a foot or more long, with a large number of coriaceous (often not opposite) leaflets, much paler beneath. *Panicles* large, spreading, and much-branched; rachis and pedicels covered with a rufous glandular pubescence. *Petals* 4 times as long as calyx-segments, $\frac{1}{6}$ by $\frac{1}{20}$ in. broad, very finely pubescent within and without. *Filaments* broad, half as long as the petals, glabrous, with a ligulate ciliated appendage at the base. *Drupes* hard, ovoid, $\frac{1}{2}$ in. long, $\frac{1}{3}$ in. broad.—I am unable to distinguish the specimen of Planchon's *E. merguensis* in the Hookerian Herbarium by the alleged character of the filaments; otherwise it precisely resembles the type.

2. **E. apiculata,** *A. W. Bennett;* leaflets elliptic apiculate, panicles slightly hairy, calyx hairy without, petals ligulate, filaments not appendiculate.

PENANG, *Maingay.*

Leaves very long; leaflets ending in an abrupt point, dotted on the lateral veins beneath. *Panicles* denser than in *E. longifolia;* the rachis and pedicels slightly hairy. *Calyx*-segments not ciliate. *Petals* very narrow, 1 lin. long, ½ lin. broad, glabrous. *Filaments* very short, ¼–⅓ as long as the petals, glabrous. *Fruit* unknown.

7. **SURIANA,** Linn.

An insipid littoral shrub. *Leaves* simple, entire. *Flowers* hermaphrodite, conspicuous. *Calyx* 5-partite, imbricate, persistent. *Petals* 5, imbricate. *Disk* inconspicuous. *Stamens* 10, unequal in length, 5 sometimes barren. *Ovary* of 5 free carpels; styles basilar, filiform; ovules 2 in each carpel, lateral. *Fruit* consisting of 5 or fewer carpels covered by the persistent calyx, each 1-seeded, indehiscent. *Seed* ascending, exalbuminous.

1. **S. maritima,** *Linn. Gen.* No. 581; *DC. Prodr.* ii. 91; *W. & A. Prodr.* 361.

Throughout the tropical shores of India.—DISTRIB. Cosmopolitan.

Branches thick, covered with a velvety pubescence. *Leaves* about 1 in. long, linear-spathulate, obtuse, velvety. *Flowers* ⅓–½ in. across, terminal, hidden by the leaves. *Petals* ¼ by ⅓ in. long, equalling the calyx, ovate-acute, yellow.

8. **IRVINGIA,** Hook. f.

Glabrous insipid trees. *Leaves* simple, coriaceous, entire, with deciduous stipules. *Flowers* hermaphrodite, in axillary panicles, ebracteate. *Calyx* small, 4–5-partite, imbricate. *Petals* 4–5, imbricate. *Disk* very large, cushion-shaped and folded. *Stamens* 10, inserted beneath the disk, filaments long, slender. *Ovary* conical, compressed, 2-celled, entire; style simple, terminal; ovules solitary. *Fruit* large, drupaceous, 1-seeded. *Seed* pendulous, exalbuminous.—DISTRIB. Species 3–4; all but the following Tropical African.

1. **I. malayana,** *Oliver, ms.*

MALACCA, *Maingay.*

Branches striated, glabrous, annulated at or near the nodes. *Leaves* large and thick, 4 by 2 in., elliptic, acute, quite entire, petiolate, base rounded and somewhat unequal. *Flowers* small, hermaphrodite, in axillary racemes or panicles. *Calyx* persistent; lobes ovate, obtuse. *Petals* twice as long as the calyx-lobes, reflexed after flowering. *Filaments* as long as the petals. *Ovary* conical, rising from the centre of a very large disk and narrowing into a terminal style.

9. **BALANITES,** Delile.

Spiny shrubs or trees. *Leaves* coriaceous, 2-foliolate, entire. *Flowers* green, in small axillary cymes. *Calyx*-segments 5, imbricate, deciduous. *Petals* 5, imbricate. *Disk* thick, conical, entire. *Ovary* entire, globose, 1-celled; ovules solitary, pendulous. *Fruit* a large fleshy oily 1-seeded drupe. *Seed* pendulous, exalbuminous.—DISTRIB. Tropical and Northern Africa, Syria, and W. Asia; species 2 (?).

1. **B. Roxburghii,** *Planch. in Ann. Sc. Nat. ser.* 4, ii. 258; petals velvety. *Brandis. For. Flor.* 59. B. ægyptiaca, *Wall. Cat.* 6855; *Grah. Cat. Bomb. Pl.* 23; *Wight Ic.* t. 274. Ximenia ægyptiaca, *Roxb. Fl. Ind.* ii. 253.

Drier parts of India from CAWNPORE to SIKKIM, BEHAR, GOOZERAT, KANDEISH, and the DECCAN; BIRMA, *Griffith.*

A small tree, 20 ft. high, with glabrous or puberulous *branches* ending in very strong sharp ascending spines. *Leaves* of two elliptical or obovate puberulous entire coriaceous leaflets. *Cymes* 4–10-flowered. *Sepals* and *petals* ovate, velvety-pubescent. *Filaments* filiform-subulate. *Fruit* large, woody, angular, more than an inch long.—Very nearly allied to, and perhaps only a variety of, the *B. œgyptiaca* of northern and tropical Africa.

ORDER XXXV. **OCHNACEÆ.** (By Alfred W. Bennett, F.L.S.)

Glabrous trees or shrubs, with watery juice. *Leaves* alternate, simple, (very rarely pinnate) coriaceous; stipules 2. *Inflorescence* panicled or occasionally umbellate (rarely flowers solitary), bracteate. *Flowers* hermaphrodite, conspicuous. *Sepals* 4–5, free, imbricate, persistent. *Petals* 5, rarely 4 or 10, free, hypogynous, imbricate, longer than the sepals, deciduous. *Disk* enlarged after flowering, occasionally 0. *Stamens* 4, 5, 8, 10, or indefinite, inserted on the disk; filaments persistent; anthers basifixed, sometimes deciduous, dehiscing longitudinally, or often opening by terminal pores. *Ovary* short, 2-celled or elongate and 1–10-celled; placenta axile or parietal; style simple, subulate, acute, rarely divided at the extremity, stigmas simple, terminal; ovules 1–2 in each cell or indefinite, ascending or rarely pendulous, raphe ventral, micropyle superior. *Fruit* indehiscent, drupaceous or baccate, compound, each drupe or pyrene 1–4-seeded; or capsular and 1–5-celled with septicidal dehiscence. *Seeds* solitary, few, or numerous; albumen fleshy or 0; embryo straight or rarely curved, radicle superior or inferior.—DISTRIB. Tropical regions of both hemispheres, chiefly American; species about 150.

TRIBE I. **Ochneæ.** *Ovary* 2–10-celled; ovules solitary in each cell. *Seeds* exalbuminous.

Stamens ∞; flowers paniculate	1. OCHNA.
Stamens 10; flowers paniculate or umbellate	2. GOMPHIA.
Sepals, petals, and stamens 4	3. TETRAMERISTA.

TRIBE II. **Euthemideæ.** *Ovary* semi-5-celled; ovules 2 in each cell. *Seeds* albuminous.

Stamens 5, with alternate staminodes	4. EUTHEMIS.

1. **OCHNA,** Linn.

Glabrous trees or shrubs. *Leaves* alternate, simple, serrate, rarely entire, 2-stipulate. *Flowers* large, yellow, in bracteate panicles or umbels. *Sepals* 5, coloured, persistent. *Petals* 5–10, deciduous. *Disk* thick, lobed. *Stamens* ∞, shorter than the petals, filaments short or elongated; anthers opening longitudinally, deciduous. *Ovary* deeply 3–10-lobed, lobes 1-celled; styles entirely connate or distinct at the apex; ovules solitary in each cell, axile. *Fruit* of 3–10 drupes seated on the broad disk. *Seed* erect, albuminous.—DISTRIB. Tropical Asia and Africa; species about 25.

1. **O. squarrosa,** *Linn.*; *DC. Prodr.* i. 735; leaves from narrowly oblong to oblong-ovate or obovate, acute obtuse or mucronate, finely serrate, flowers fragrant, petals 7–12 (rarely 5), anthers very long deciduous, with very short persistent filaments, styles united to the apex. *Roxb. Fl. Ind.* ii. 643; *Cor. Pl.* i. t. 89; *Wight Ill.* i. t. 69; *Grah. Cat. Bomb. Pl.* 37; *Dalz. & Gibs. Bomb. Fl. Suppl.* 17. O. lucida, *Lamk. Ill.* t. 472, f. i.; *DC. l.c.*; *Planch. in Hook. Journ. Bot.* v. 649; *Griff. Not.* iv. 464, t. 605, f. vi. O. nitida, *Thunb.*; *DC. l.c.*; *Planch. l.c.* 650 (*not of Wall.*). O. rufescens (?) *Thunb. l.c.*; *Thw. Enum.* 70. O. obtusata, *DC. l.c.* 735; *Wall. Cat.* 2805. X

Silhet; Birma; Pegu; Eastern and Western Peninsulas, and Ceylon.

Leaves very various in size and shape; stipules $\frac{1}{6}$–$\frac{1}{4}$ in. *Flowers* $\frac{1}{2}$–$\frac{3}{4}$ in. across, in loose axillary panicles. *Petals* not much longer than the sepals, clawed. *Anthers* many times longer than the very short filaments. *Style* greatly exceeding the stamens. *Drupes* $\frac{1}{4}$ in. long, seated on the greatly enlarged disk, and surrounded by the persistent coriaceous calyx.—Griffith's *O. lucida* is described as having 5 petals, but is apparently the same plant.

Var. *cordata;* leaves much smaller cordate at the base and rounded at the apex more sharply serrate. O. cordata, *Thw. Enum.* 70.—Ceylon.

2. **O. Wallichii,** *Planch. in Hook. Lond. Journ. Bot.* v. 650; leaves oblong-elliptic very finely serrate, petals 5, anthers not longer than the filaments, styles united nearly to apex. O. nitida, *Wall. Cat.* 2804 (*not of Thunb.*). O. stipulacea (?), *Colebr. ms.; Wall. Cat.* 2806; *Planch. in Hook. Lond. Journ. Bot.* v. 653. O. squarrosa, *Kurz Andam. Rep. App.* iv. (*not of Linn.*). O. andamanica, *Kurz Rep. And. ed.* ii. 33, and in *Journ. As. Soc. Beng.* xli. pt. 2, 295.

Tenasserim, Tavoy, the Andaman Islands, and Pegu.

Leaves 4 by 1$\frac{1}{2}$ in. or larger, acute, very shortly petioled; stipules very minute. *Flowers* on very long pedicels, in loose axillary panicles. *Sepals* ovate or lanceolate, generally reflexed after flowering. *Petals* somewhat longer than the sepals. *Anthers* elongated, but rather shorter than the very slender persistent filaments. *Styles* greatly exceeding the stamens.

Var. *parviflora;* flowers much smaller. O. parviflora, *Griff. Not.* iv. 464.—Moulmein, *Griffith.*

3. **O. Wightiana,** *Wall. Cat.* 2808; leaves elliptical to ovate base rounded subcordate subobtuse coriaceous serrulate, flowers solitary or in pairs or rarely 3, petals 5, anthers about as long as the filaments, style 5-cleft at the apex. *W. & A. Prodr.* 152; *Thwaites Enum.* 70; *Wight Ic.* t. 223 (?); *Planch. in Hook. Lond. Journ. Bot.* v. 653. O. Heyneana, *W. & A. l.c.; Planch. l.c.* 653. O. Walkerii, *Planch. l.c.* O. parvifolia, *Vahl ?, Wall. Cat.* 2807. O. Moonii, *Thwaites Enum.* 70.

Travancor, *Wight;* warmer parts of Ceylon.

Leaves much smaller than in *O. squarrosa* and *Wallichii,* 1–1$\frac{1}{4}$ by $\frac{1}{2}$–$\frac{3}{4}$ in., but often narrower, very shortly stalked; stipules very slender, $\frac{1}{8}$–$\frac{1}{4}$ in. *Flowers* axillary, usually solitary, smaller than in the two species named. *Sepals* usually reflexed after flowering.—In *O Moonii,* Thw., the number of flowers in a cluster is larger.—*Ochna parvifolia,* Vahl Symb. i 33; DC. Mon. Och. 17, t. xix. f. 2; Prodr. i. 736, from Arabia Felix, much resembles and may even be identical with a small-leaved form of this species.

Var. *angustifolia;* leaves narrowly elliptical tapering to either end.

4. **O. pumila,** *Ham. in Don Prodr.* 224; leaves very large more or less broadly oblanceolate serrulate, flowers very large and handsome, anthers longer than filaments, style undivided. *DC. Prodr.* i. 736; *Planch. in Hook. Lond. Journ. Bot.* v. 652. O. nana, *Ham. in Wall. Cat.* 3761; *Dalz. & Gibs. Bomb. Fl.* 46. O. humilis, *Wall. Cat.* 3762. O. collina, *Edgew. in Trans. Linn. Soc.* xx. p. 43. ? O. fruticulosa, *Kurz in Journ. As. Soc. Beng.* xli. pt. 2, 295.

Foot of the Himalaya, from Kumaon, *Edgeworth,* to Sikkim, *J. D. H.*; Pegu, *Kurz;* South Concan, *Dalz. & Gibs.*

A small shrub, 1–3 ft. (?). *Leaves* often as much as 6 in. by 2 in., narrowed below and very shortly petioled, acute or obtuse, very sharply serrulate; stipules $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* umbellate, 3–6 at the end of a common peduncle, as much as 1$\frac{1}{2}$ in. across; pedicels $\frac{1}{2}$–1 in.; common peduncle 3 in. long, bracteate at the base. *Sepals* ovate, 2–3 times shorter than the petals. *Filaments* short, surmounted by the elongated anthers. *Styles* elongate, connate or very slightly divided at the apex. *Drupes* finely reticulated.—I am unable to distinguish Kurz's *O. fruticulosa* from Pegu by the description. The Concan habitat is taken from the Bombay Flora.

5. (?) **O. brevipes,** *Planch. in Hook. Lond. Jour. Bot.* v. 652; flowers nearly sessile in compound fascicles, anthers somewhat longer than the filaments, styles undivided.

PEGU.

Leaves unknown, deciduous. *Flowers* ½–¾ in. across. *Sepals* elliptical. *Petals* 5, obovate, suddenly narrowed into a claw. *Styles* about as long as stamens.

2. **GOMPHIA,** Schreb.

Glabrous trees or shrubs. *Leaves* alternate shining, 2-stipulate. *Flowers* yellow, in axillary or terminal racemes or umbels. *Sepals* 5, coloured, persistent. *Petals* 5, imbricate. *Disk* thick, lobed. *Stamens* 10, inserted at the base of the disk, filaments very short; anthers opening by terminal pores. *Ovary* deeply 5–6-lobed, lobes 1-celled; styles connate, stigma simple; ovules solitary in each cell, erect. *Drupes* 5 or fewer, seated on a broad disk, 1-seeded. *Seed* erect, exalbuminous.—DISTRIB. Chiefly tropical South American; a few are Asiatic and African; species about 80.

1. **G. angustifolia,** *Vahl Symb.* ii. 49; leaves coriaceous narrowly ovate acute serrulate sessile, flowers in compound rather dense terminal racemes, drupes ovoid. *DC. Prodr.* i. 736; *W. & A. Prodr.* 152; *Grah. Cat. Bomb. Pl.* 38; *Thwaites Enum.* 71; *Planch. in Hook. Lond. Journ. Bot.* vi. 3. G. zeylanica, *DC. l.c.*; *Wall. Cat.* 2802. G. malabarica, *DC. l.c.* Ochna zeylanica, *Lam.* Walkera serrata, *Willd.*, *DC. Prodr.* i. 737. Meesia serrata, *Gærtn. Fruct.* i. t. 70.—*Burm. Fl. Zeyl.* t. 56; *Rheede Hort. Mal.* v. t. 48 and 52 (monstrous).

Southern provinces of the WESTERN PENINSULA, from the South Concan to Travancor; SINGAPORE, *Walker*; common in CEYLON.—DISTRIB Philippines.

A small tree, 30 ft. high. *Leaves* about 5 in. by 1 in., very shining; stipules linear, deciduous. *Flowers* about ½ in. across, very numerous, on slender pedicels. *Sepals* oval, coriaceous. *Petals* longer than sepals, deciduous. *Anthers* elongated, about as long as petals, nearly sessile. *Carpels* obovate or reniform; styles 10, larger than stamens, persistent in fruit, stigma quite entire. *Drupes* about the size of peas, smooth, shining, reticulated.

2. **G. sumatrana,** *Jack in Mal. Misc.* No. v. p. 29, *and in Hook. Bot. Misc.* ii. 77; leaves narrowly ovate serrulate, panicle very diffuse. *Wall. Cat.* 2803. G. sumatrensis, *Planch. in Hook. Ic. Pl.* t. 712, and *Hook. Lond. Journ. Bot.* vi. 2. Ochna crocea, *Griff. Not.* iv. 463. Euthemis elegantissima (?), *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 305. E.? pulcherrima, *Wall. Cat.* 2518.

SINGAPORE, *Wallich;* MALACCA, *Maingay.*—DISTRIB. Sumatra, Borneo.

Very closely allied to *G. angustifolia*, there being scarcely any characters by which it can be distinguished, except the much more diffuse character of the panicle.

3. **G. Hookeri,** *Planch. in Hook. Lond. Journ. Bot.* vi. 3; leaves coriaceous narrowly ovate entire shortly petioled, flowers in terminal umbels, drupes ovoid.

PENANG, *Phillips;* MALACCA, *Maingay.*

Leaves about 4 in. by 1½ in., narrowed into the short petiole; stipules deciduous. *Flowers* rather smaller than in *G. angustifolia,* on long slender pedicels, 10–20 in an umbel. *Sepals* ovate, coriaceous. *Styles* quite connate; stigma entire. *Drupe* smooth, not reticulated.—This species is rather a *Brackenridgia* (A. Gray, Bot. U. S. Expl. Exped. 361) than a *Gomphia,* if the two genera are to be kept distinct, and *Brackenridgia* not rather to be considered as a section of *Gomphia,* as suggested by Oliver (in Hook. Ic. Plant. xi. t. 1096). *Brackenridgia* is not otherwise a Malayan genus.

DOUBTFUL SPECIES.

"G. UMBELLATA," *Hook. f. ms.*, from Penang, appears distinct; but the specimens are not sufficiently perfect for determination.

3. TETRAMERISTA, Miq.

Shrubs or trees. *Leaves* very large, coriaceous, entire. *Flowers* in axillary racemes, with large foliaceous bracts. *Sepals* 4, imbricate, persistent; 2 outer ones larger. *Petals* 4, persistent. *Stamens* 4; filaments dilated at the base; anthers dehiscing longitudinally. *Ovary* 4-angled, 4-celled; style entire. *Fruit* a globose 4-seeded coriaceous berry.—DISTRIB. Malayan Peninsula and Islands. Species 1–2.

1. **T. glabra,** *Miq. Fl. Ind. Bat. Suppl.* 534; var. *sagittata;* leaves sagittate at the base. Ancistrocladus? sagittatus, *Wall. Cat.* 1055.

SINCAPORE, *Wallich;* TENASSERIM (or the Andaman Islands), *Helfer;* Kedah Peak, MALACCA, *Low.*

Leaves obovate, rounded at the apex. *Sepals* in two series, lanceolate. *Petals* resembling the sepals, but rather smaller. *Filaments* filiform above. *Style* single, central. —*T. glabra* is a Sumatran plant, entered as Indian on account of some specimens in Herb. Kew., collected by Helfer, either in "Tenasserim or the Andaman Islands," and by Wallich at Sincapore, without flowers, but apparently belonging either to this species or to an allied one, differing in the sagittate base of the leaves.

4. EUTHEMIS, Jack.

Glabrous shrubs. *Leaves* alternate, simple, shining, coriaceous, serrulate, with ciliate deciduous stipules. *Flowers* rose or white, in terminal or leaf-opposed racemes, bracteate. *Sepals* 5, imbricate, persistent or deciduous. *Petals* 5, longer than sepals, imbricate. *Disk* small, conical. *Stamens* 5, inserted at the base of the disk, with alternate staminodes; anthers opening by terminal pores. *Ovary* semi-5-celled, elongate, viscid; style 1, stigma entire; ovules 1–2 in each cell, pendulous. *Fruit* a berry of 5 pyrenes, each 1–2-seeded. *Seeds* pendulous with a fleshy albumen.—DISTRIB. Species 4, natives of the Malayan Archipelago.

1. **E. leucocarpa,** *Jack in Mal. Misc.* No. v. p. 16; leaves large acute very gradually narrowed into the petiole very beautifully serrulate on the thickened margin, flowers in rather small terminal branched racemes, berry snow-white. *Roxb. Fl. Ind. ed. Carey,* ii. 303; *Planch. in Hook. Ic. Pl.* viii. t. 711.

Mounts Gerai and Ophir, alt. 3000 ft., in MALACCA, *Lobb.*—DISTRIB. Malayan Archipelago.

An erect shrub, 4–5 ft. *Leaves* narrowly elliptic, 4 in. by 1½ in., with fine curved nearly parallel veins running from the midrib to the thickened margin; stipules acuminate, ciliate, deciduous. *Sepals* ovate, thick, ciliate-serrate. *Petals* twice as long as the sepals, reflexed. *Filaments* very short. *Ovary* elongate, acute; style, tapering. *Berry* crowned by the persistent style, 5-seeded.

2. **E. minor,** *Jack in Mal. Misc.* No. v. p. 18; leaves narrowly lanceolate, obtuse, mucronate obscurely serrulate, racemes simple, berry red. *Roxb. Fl. Ind. ed. Carey,* ii. 304.

SINCAPORE and PENANG.—DISTRIB. Malayan Archipelago.

A small shrub. *Leaves* much smaller than in *E. leucocarpa,* coriaceous, narrowed, into the petiole, obscurely veined; stipules linear, ciliate, deciduous. *Sepals* ovate-ciliate. *Filaments* short. *Ovary* ovate, acute. *Berry* 5-seeded.

DOUBTFUL SPECIES.

E.? ELEGANTISSIMA, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 305, is probably a distinct plant, but is only imperfectly known. Planchon (Hook. Lond. Journ. Bot. v. 64) suggests that it may be *Gomphia sumatrana*, with which, however, the description of the leaves does not appear to agree. Wallich describes it as having elliptic-lanceolate leaves tapering at both ends, finely acuminate, sharply and minutely serrulate, the nerves reticulating and uniting in two or more submarginal arches.—Native of Sincapore and the contiguous islands.

ORDER XXXVI. **BURSERACEÆ.** (By Alfred W. Bennett, F.L.S.)

Balsamiferous trees or shrubs. *Leaves* alternate (very rarely opposite), imparipinnate or trifoliolate (very rarely unifoliolate), stipulate or exstipulate. *Inflorescence* racemose or paniculate. *Flowers* regular, small, hermaphrodite or often polygamous. *Calyx* free, 3–6-lobed, imbricate or valvate, often minute. *Petals* 3–6, distinct, rarely connate, imbricate or valvate. *Disk* annular or cupular, usually conspicuous, free or adnate to the base of the calyx. *Stamens* as many or twice as many as petals, inserted at the base or margin of the disk, equal or unequal; filaments free, rarely connate at the base, smooth, ; anthers dorsifixed rarely adnate, 2-locular, dehiscing longitudinally. *Ovary* free, rarely 1- more often 2–5-celled; style simple, stigma undivided or 2–5-lobed; ovules 2 or rarely 1 in each cell, anatropous, axile, usually pendulous rarely ascending, micropyle superior, raphe ventral. *Fruit* drupaceous, indehiscent, containing 2–5 pyrenes, rarely pseudo-capsular and dehiscent. *Seeds* solitary, pendulous, testa membranous, albumen 0; cotyledons usually membranous, contortuplicate, rarely fleshy and planoconvex, radicle superior.—DISTRIB. Tropical regions of both hemispheres; genera 16–18; species about 160.

Drupe valvately dehiscent, pyrenes separating.
  Drupe trigonous . . . . 1. BOSWELLIA.
  Drupe broadly 3-winged . . . . 2. TRIOMMA.
Drupe indehiscent, pyrenes not separating.
  Stamens 6–10.
    Calyx 5-fid, urceolate. Disk clothing tube of calyx . . 3. GARUGA.
    Calyx 4-toothed, urceolate. Disk cupular. Flowers few, fasciculate . . . . 4. BALSAMODENDRON.
    Calyx 4–6-toothed, small. Disk clothing base of calyx. Stamens 8–10. Inflorescence paniculate . . . . . 5. PROTIUM.
    Calyx 4–6-lobed, imbricate. Disk annular. Stamens 8–10 . . . . 6. BURSERA.
    Calyx usually 3-fid, valvate. Drupe ellipsoid, usually trigonous; style terminal . . . . 7. CANARIUM.
    Calyx 3-fid, valvate. Drupe usually gibbous; style lateral . . . . 8. SANTIRIA.
    Calyx 3-partite, large, valvate. Drupe globose . . . 9. TRIGONOCHLAMYS.
  Stamens 5 . . . . 10. FILICIUM.

1. **BOSWELLIA,** Roxb.

Balsamiferous trees, bark frequently papyraceous. *Leaves* alternate, exstipulate, imparipinnate, deciduous, with opposite sessile usually serrate leaflets. *Flowers* small, white, hermaphrodite, in axillary racemes or panicles. *Calyx* small, 5-toothed, persistent. *Petals* 5, distinct, narrowed at the base, imbricate. *Disk* annular, crenate. *Stamens* 10, 5 long 5 short, inserted at the base of the disk. *Ovary* sessile, 3-celled; style short, stigma 3-lobed; ovules 2 in each cell, pendulous. *Drupe* trigonous, containing 3 1-seeded pyrenes which finally separate. *Seeds* compressed, pendulous.—DISTRIB. India and Tropical Africa; species about 6.

1. **B. serrata,** *Roxb. ex Colebr. in Asiat. Res.* ix. 379, t. 5; leaflets sessile pubescent coarsely crenate-serrate, racemes axillary shorter than the leaves. *Stackhouse, Extracts*, p. xix; *Colebr. in Trans. Linn. Soc.* xv. 363, t. v. fig. 1; *Wall. Cat.* 8486. B. thurifera, *Roxb. ex Fleming in Asiat. Res.* xi. 158; *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 383; *W. & A. Prodr.* 174; *Grah. Cat. Bomb. Pl.* 42; *Birdwood in Trans. Linn. Soc.* xxvii. 146; *Brandis For. Flor.* 61. Libanus thurifera, *Colebr. in Asiat. Res.* ix. 382. Libanotus asiaticus, *Stackhouse, De Liban.* 13, t. iii. fig. 6.

Forests of the base of the WESTERN HIMALAYA, as far west as the Sutlej; Central India, from BEHAR to RAJPATANA, and southward into the DECCAN, and to the Circars and the Concan.

Leaves of a large number of opposite or nearly opposite lanceolate or ovate acute or obtuse inequilateral leaflets, very variable in size, shape, and degree of pubescence. *Calyx-segments* deltoid. *Drupe* ½ in. long, trigonous, splitting into three valves, subtended by the woody disk.

VAR. *glabra;* leaflets nearly or quite glabrous, often nearly entire. B. glabra, *Roxb. Hort. Beng.* 90; *Cor. Pl.* iii. t. 207; *Fl. Ind.* ii. 384; *Grah. Cat. Bomb. Pl.* 42; *DC. Prodr.* ii. 76; *W. & A. Prodr.* 174; *Bedd. Fl. Sylv.* t. 124. Chloroxylon Dupada, *Buch. Journ. Mys.* i. 184.—Scarcely a species, running by insensible gradations into the typical form.—N. W. India; Siwalik hills, near Khizeraband, *Edgeworth;* Padshapoor (near Belgaum), *Ritchie.*

2. TRIOMMA, Hook. f.

A tree; branchlets robust, pubescent. *Leaves* alternate, exstipulate, imparipinnate, with opposite petiolulate leaflets. *Flowers* very small, in terminal panicles, polygamous (?). *Calyx* 5-fid. *Petals* 5, small, valvate (?) *Stamens* 10 (?) inserted at the base of the 5-lobed disk. *Ovary* trigonous, 3-celled; style short; ovules 2 in each cell. *Fruit* 3-winged, 3-valved, as much as 2–2½ inches long, containing 3 hard woody separable pyrenes.—DISTRIB. A solitary species.

1. **T. malaccensis,** *Hook. f. in Trans. Linn. Soc.* xxiii. 171; leaflets oblique ovate-lanceolate acuminate entire, drupe ovate-caudate acutely cuspidate. Arytera? macrocarpa *Miq. Fl. Ind. Bat. Suppl.* 199 *(according to T. Anderson in Herb. Kew.).*

MALACCA, *Griffith, Maingay.*

3. GARUGA, Roxb.

Trees; branchlets pubescent. *Leaves* alternate, exstipulate, imparipinnate, crowded towards the ends of the branches, with opposite subsessile crenate leaflets. *Flowers* polygamous, in much-branched panicles. *Calyx* campanulate, 5-fid, valvate, clothed within by the ample disk. *Petals* 5, inserted on the tube of the calyx, induplicate-valvate. *Stamens* 10, equal, inserted in the tube of the calyx at the margin of the disk, filaments hairy at the base. *Ovary* sessile, 4–5-celled; style erect, stigma capitate 4–5-lobed; ovules 2 in each cell. *Drupe* globose, fleshy, containing 1–5 1-seeded pyrenes.—DISTRIB. Tropical Asia, America, and Australia; species 8–10.

1. **G. pinnata,** *Roxb. Cor. Pl.* iii. t. 208; leaflets ovate obtusely acuminate oblique crenate, flowers ⅙–¼ in. long pubescent. *Roxb. Fl. Ind.* ii. 400; *Grah. Cat. Bomb. Pl.* 43; *DC. Prodr.* ii. 81; *W. & A. Prodr.* 175; *Bedd. Fl. Sylv.* t. 118; *Brandis For. Flor.* 62; *Wall. Cat.* 8485; ? G. madagascariensis, *DC. l.c.*—*Rheede Hort. Mal.* iv. t. 33.

Throughout INDIA, and from the Jumna eastwards to BIRMA, and southwards to the NILGHIRIS and TENASSERIM; ascending to 3000 ft. in the Himalaya.—DISTRIB. Malayan Archipelago, Philippines.

A tree 30–40 ft. *Leaves* 1 ft. or more, pubescent when young, afterwards glabrous. *Panicle* very large, compound, pubescent. *Calyx*-teeth ovate, pubescent. *Petals* linear, inserted between the calyx-teeth. *Disk* completely clothing the tube of calyx. *Stamens* about as long as the petals. *Ovary* ovoid, narrowing into the hairy style; stigma capitate, 5-lobed. *Drupe* black, "size of a gooseberry."

4. **BALSAMODENDRON,** Kunth.

Balsamiferous often spiny trees or shrubs. *Leaves* alternate, 1-5-foliolate or imparipinnate; leaflets sessile, oblique, crenate or serrate. *Flowers* small, polygamous, fasciculate, on short petioles or sessile. *Calyx* tubular, 3-4-toothed, persistent. *Petals* 3–4, valvate. *Disk* erect, cupular. *Stamens* 6–8, usually 4 long and 4 short, inserted on the margin of the disk. *Ovary* sessile, 4-celled, surrounded by the disk; style short, stigma obtuse 4-lobed; ovules 2 in each cell. *Drupe* ovoid, containing a 1–3-celled and -seeded stone or 1–3 stones.—Distrib. India, Arabia, Tropical and Southern Africa; species 6–10. (See Berg. in *Bot. Zeit.* 1862. 153, 161.)

1. **B. Mukul,** *Hook. ex Stocks in Hook. Kew Journ. Bot.* i. 259, t. 8; branches generally ending in a sharp spine, leaves 1–3-foliolate, leaflets smooth and shining obovate nearly sessile toothed at the end. *Boiss. Fl. Orient.* ii. 3; *Brandis For. Flor.* 64. B. Roxburghii, *Stocks in Bomb. Trans.* 1847 (*excl. syn.*); *Dalz. & Gibs. Bomb. Fl. Suppl.* 19 (*not of Arn.*). (?) B. Wightii, *Arn. in Ann. Nat. Hist.* iii. 86; *Wight Ill.* i. 185.

Sindh, *Stocks;* Rajpootana, Bednore, *Brandis;* Khandeish and Berar, *Dalz. & Gibs.;* ? Mysore, Bellary, *Wight.*—Distrib. Beluchistan, Arabia?

A small tree 4–6 ft. *Branches* slightly ascending. *Flowers* nearly sessile, a few in each fascicle, unisexual, the male with small abortive ovary, the female with short barren stamens. *Calyx* forming a cylindrical cup, glandular-hairy. *Petals* 4–5, ligulate, brownish red, recurved at the tip, 3 times as long as calyx. *Disk* 8–10-toothed. *Stamens* 8–10. *Stigma* obscurely 2-lobed. *Drupe* red, ovate-acuminate, containing 2 2-celled stones, rarely 4-valved.—I follow the suggestion of Brandis in referring to the Bellary plant (*B. Wightii*) under *B. Mukul*, from which it appears to be indistinguishable, though without flowers. Brandis remarks, "This species will probably be found to be indigenous on arid rocky hills throughout Rajputana and a great part of the Dekkan" (l.c. p. 65).—Gugal.

2. **B. Roxburghii,** *Arn. in Ann. Nat. Hist.* iii. 86; branches spiny, leaves 3-foliolate, terminal leaflet very finely serrulate, lateral leaflets very small. *Wight Ill.* i. 185. Amyris Commiphora, *Roxb. Fl. Ind.* ii. 244; *Wall. Cat.* 8498. ? A. Agallocha, *Roxb. Hort. Beng.* 28.

Eastern Bengal; Silhet and Assam, *Roxburgh, &c.*

Very similar to *B. Mukul*, and possibly identical, but only imperfectly known; the leaves appear to be larger and of a thinner texture. I have only seen specimens of Wallich's and Rottler's from the Mission Garden of Madras, to which Rottler has attached the name *Amyris serratifolia*, nob.

3. **B. pubescens,** *Stocks in Bomb. Trans.* 1847; *Hook. Kew Journ. Bot.* i. 264, t. 9; branches not spiny, leaves petioled, 3–5-foliolate, leaflets entire. *Boiss. Fl. Orient.* ii. 2; *Brandis For. Flor.* 64.

Rocky parts of Sindh, *Stocks.*—Distrib. Beluchistan.

A small tree with pubescent unarmed branches. *Leaves* on slender petioles longer than the blade, soft and downy when young, lateral leaflets nearly orbicular, terminal obovate-cuneate, petiolulate. *Flowers* sessile. *Stamens* equal. *Drupe* red, with 2 stones.

4. **B. Berryi,** *Arn. in Ann. Nat. Hist.* iii. 86; branches spiny, leaves 3-foliolate petioled glabrous entire, calyx 3-4-cleft, petals 3–4, stamens 6–8,

the alternate ones smaller. *Wight Ill.* i. 185; *Bedd. Fl. Syl.* t. 126; *Brandis For. Flor.* 65. Protium gileadense, *W. & A. Prodr.* 177, *exclud. synon.; Grah. Cat. Bomb. Pl.* 43, (*not* B. gileadense *DC.*). Amyris gileadensis, *Roxb. Fl. Ind.* ii. 246.

WESTERN PENINSULA; in dry forests East of the Nilghiris and Sivagherry Hills (cultivated for hedging throughout S. India).

Branches patent, the lateral ones ending in very abrupt spines. *Leaves* alternate or fascicled; leaflets obovate, sessile, the terminal one twice as large as the lateral ones. *Flowers* nearly sessile, solitary or fascicled. *Disk* small, 6–8-lobed. *Drupe* oblong, apiculate.

5. **PROTIUM,** W. & A.

Small balsamiferous spiny trees. *Leaves* alternate, 3-foliolate or imparipinnate, with entire or toothed leaflets. *Flowers* small, on long pedicels in much branched cymes. *Calyx* small, cupular, 4–6-fid or -toothed. *Petals* 4–6, linear-oblong, valvate. *Disk* clothing the bottom of the calyx-cup, with free margin. *Stamens* 8–12, inserted in the margin of the disk, unequal. *Ovary* 2–4-celled, sessile; style short, stigma 3–6-lobed; ovules 3 in each cell. *Drupe* fleshy, globose, containing 1–4 pyrenes. *Seeds* oblong; radicle superior.—DISTRIB. India, Java, subtropical Africa. Species 3–4.

1. **P. caudatum,** *W. & A. Prodr.* 176; leaves 3–7-foliolate, leaflets glabrous more or less abruptly acuminate, cyme branched many times dichotomously greatly exceeding the leaves. *Bedd. Fl. Sylv.* t. 125; *Wall. Cat.* 8494, 8495.

WESTERN PENINSULA; CEYLON, at Jaffoa.

Leaves long-petioled with short lateral leaflets, the terminal one with a long petiolule, ovate, entire. *Cymes* bracteate at the branches, the bracteoles beneath the flowers very minute. *Flowers* polygamous, small. *Calyx*-lobes deltoid, acute, as long as broad. *Petals* about twice as long as calyx-lobes. *Drupe* about the size of a pea, nearly globular, subtended by the persistent calyx.

VAR. *Roxburghiana*, W. & A. l.c. (species); leaflets not acuminate, but ending in a short abrupt point. Amyris acuminata, *Roxb. Fl. Ind.* ii. 246; *Wall. Cat.* 8496.—Pulney Mts., *Wight.*

2. **P. pubescens,** *W. & A. Prodr.* 176; leaflets pubescent obtusely acuminate, cyme (panicle ?) rather dense branched many times but not dichotomously. *Wall. Cat.* 8497.

WESTERN PENINSULA, *Wight.*

Leaflets about 7, ovate or obovate, entire, very shortly petiolulate. *Bracts* in the upper part of the inflorescence exceeding flowers. *Flowers* rather shortly pedicelled. *Calyx-segments* lanceolate, twice as long as broad. *Drupe* rather larger than in *P. caudatum.*

6. **BURSERA,** Linn.

Balsamiferous trees. *Leaves* alternate, imparipinnate, or rarely 1-foliolate. *Panicles* short, branched. *Flowers* hermaphrodite or polygamous. *Calyx* small, 4–6-partite or -toothed, imbricate. *Petals* 4–6, short, patent at length reflexed, usually valvate. *Disk* annular, crenate. *Stamens* 8–12, nearly equal, inserted at the base of the disk. *Ovary* free, ovoid or subglobose, 3–5-celled; style very short, stigma 3–5-lobed; ovules 2 in each cell. *Drupe* globose or ovoid, with 3–5 pyrenes.—DISTRIB. About 40 species, mostly natives of Tropical America.

1. **B. serrata,** *Colebr. in Trans. Linn. Soc.* xv. 361, t. 4; leaflets narrowed below acuminate, drupe globose 1–3-celled, the pedicel greatly

thickened and elongated. *Brand. For. Flor.* 61. Icica indica, *W. & A. Prodr.* 177; *Wall. Cat.* 8492. Limonia pentagyna, *Roxb. Fl. Ind.* ii. 382, *ex Kurz in Journ. As. Soc. Beng.* 1870, ii. 70.

EASTERN BENGAL; Garrow hills and Rajmahal hills, ASSAM; and CHITTAGONG. The CIRCARS, *Roxburgh.*

Leaflets about 7 or more, opposite, petiolulate, ovate, pubescent or nearly glabrous, serrulate or quite entire. *Panicles* axillary, lax, much branched, shorter than the leaves, bracteate. *Flowers* very small, hermaphrodite, pubescent externally. *Calyx* obtusely 5-toothed. *Petals* 5, recurved. *Stamens* 10, shorter than the petals.

7. **CANARIUM,** Linn.

Balsamiferous trees. *Leaves* alternate, imparipinnate, stipulate or exstipulate. *Flowers* bracteate, in terminal or axillary panicles, hermaphrodite or polygamous. *Calyx* cupuliform or campanulate, 3-lobed or -fid (5-lobed in § *Scutinanthe*), valvate. *Petals* 3–5, imbricate below or valvate, usually exceeding calyx. *Stamens* 6 (10 in § *Scutinanthe*), distinct, inserted on margin or outside of disk, or filaments confluent below and distinct from disk. *Ovary* 2–3-celled; ovules 2 in each cell; style various, or stigma subsessile, capitate. *Drupe* usually ellipsoidal, more or less distinctly trigonous, with a 1–3-celled, 1–3-seeded stone; cotyledons often partite, contortuplicate.—DISTRIB. Tropical Asia and Malayan Archipelago. Species probably about 30.

As may be inferred from the sectional characters it is not improbable that two or three generic types are included here under *Canarium*, but the final settlement of these cannot be undertaken without the examination of a full series of Archipelago forms.

SECT. I. *Flowers* 5-merous (SCUTINANTHE, *Thw.*).

1. **C. brunneum,** *Bedd. Fl. Sylv.* t. 127; extremities shortly red-tomentose, leaves exstipulate, leaflets 5–11 oblong or ovate-oblong acuminate entire glabrescent or midrib beneath puberulous, panicles axillary branching from base red-tomentose, pedicels not exceeding 5-fid calyx, petals scarcely exceeding calyx, stamens 10 confluent in a disk adnate to calyx-tube (in ☿ fl.), ovary hirsute 2-celled, fruit drupaceous ellipsoidal shortly pointed. Scutinanthe brunnea, *Thwaites in Kew Journ. Bot.* viii. 266, t. 8 B; *Enum.* 79.

CEYLON; in the central Province, alt. 2–3000 ft., *Thwaites.*

Tree of 50–60 ft. *Leaves* 10–20 in.; leaflets 4–8 by 2–2½ in.; petiolule ⅓–½ in. *Panicles* much shorter than leaves; bracts ovate-lanceolate. *Flowers* polygamous. *Calyx* cupuliform, lobes 5 ovate-deltoid. *Petals* tomentose outside, subvalvate. *Drupe* 1–1¼ in. long, apiculate and thinly red-tomentose when dry, 1-celled (in our specimen), with thin bony stone. (*Cotyledons* entire foliaceous plicate. *Thwaites.*)—Nearly allied to this species, but with drupes 1¾ in. long, are specimens from Malacca (*Maingay*), without flowers.

SECT. II. *Flowers* normally 3-merous.

* *Stamens confluent in short disk around ovary or its rudiment. Buds sheathed by deciduous bracts. Stone thick bony.*—Canarium proper.

† *Leaflets entire.*

2. **C. commune,** *Linn.*; extremities tawny puberulous or glabrate, stipules elliptic or rotundate auricled often early deciduous, leaflets 7–9 ovate to oblong elliptical acuminate glabrous, lateral nerves about 10–15 pairs often paler and subprominent beneath, panicles terminal puberulous with

spreading successively shorter lateral branches, buds enclosed in ovate or rotundate tomentose bracts, petals 3 imbricate below, stamens (in ♂ fl.) inserted around hairy rudiment of ovary (drupe ellipsoidal subtrigonous with a bony 1–3-celled stone. *Blume*). *Kœnig. Ann. Bot.* i. 360, t. 7, f. 2; *Roxb. Fl. Ind.* iii. 137; *Blume Mus. Bot.* i. 214; *Bijd.* 1161; *DC. Prodr.* ii. 79; *W. & A. Prodr.* 175; *Miq. Fl. Ind. Bot.* vol. i. pt. 2, 643; *Wall. Cat.* 8493. Sapindus travancorensis, *Wall. Cat.* 8047.

PENANG, *Phillips, Jack.*

Leaves of flowering branches $\frac{3}{4}$–$1\frac{1}{2}$ ft. more or less; upper leaflets 4–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in.; petiolules $\frac{1}{2}$–1 in. *Flowers* variable in size, ♀ $\frac{1}{3}$ to over $\frac{1}{2}$ in. in length. *Calyx* campanulate, broadly 3-lobed. *Petals* tomentose above. *Ovary* glabrous, incrassate above. *Cotyledons* tripartite, contorted (*Blume*).—A Malayan and Archipelago plant cultivated in India.

3. **C. zeylanicum,** *Blume Mus. Bot.* i. 218; extremities tawny-puberulous, stipules deciduous, leaflets 5–9 more or less broadly elliptical shortly acuminate entire, when pressed flat the margins (of young leaves) infolded beneath glabrous, panicles terminal, of ♂ fl. lateral branches successively shorter, buds globose or ovoid at first enveloped in rotundate deciduous tawny-tomentose bracts, calyx trifid, petals imbricate, stamens of ♂ fl. inserted in disk around glabrous rudiment of ovary. Amyris zeylanica, *Retz Obs.* iv. 25. Balsamodendrum? zeylanicum, *Kunth in Ann. Sc. Nat. ser.* i. ii. 349 (adnot.); *DC. Prodr.* ii. 76; *Thwaites Enum.* 79. C. balsamiferum, *Moon Cat.* 68.

CEYLON, in warm moist districts, ascending to 1500 ft., *Thwaites*, &c.

Leaves of flowering shoots 1 ft. more or less; stipules moderately large inserted on the rachis at some little distance from the base, obliquely rotundate-sagittate, shortly stipitate, early deciduous (*Thwaites*); leaflets 4–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., petiolule $\frac{1}{6}$–$\frac{1}{2}$ in. *Female flower* $\frac{1}{3}$ in. long. *Ovary* glabrous, incrassate above as in *C. commune*. *Drupe* ellipsoidal, smooth, obscurely 3-gonous, with very thick bony stone.—Very nearly allied to *C. commune*, and now that Thwaites finds rotundate-sagittate early caducous stipules, there remains little besides the shorter petiolules of the leaflets to separate it from that species.

4. **C. secundum,** *A. W. Benn.*; tawny-pubescent, stipules 0 or early deciduous, leaflets 7–9 oblong shortly acuminate entire or faintly denticulate glabrous above except midrib, shortly pubescent, with lateral nerves in 10–15 pairs prominent with conspicuous transverse venation beneath, panicles terminal rusty-tomentose, buds subsessile in bracteate sessile or pedunculate glomerules, calyx broadly 3-lobed, petals imbricate, stamens confluent with short disk around ovoid-subulate glabrous rudiment of ovary, fruit trigonous ellipsoidal, with thick bony stone.—Canarium, *Wall. Cat.* 9046 (as to Singapore specimens).

SINGAPORE, *Wallich*; MALACCA, *Griffith, Maingay.*

Leaves 1 ft. more or less on flowering branches, leaflets varying from ovate- to lanceolate-oblong, upper 3–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., petiolule $\frac{1}{6}$ to nearly $\frac{1}{2}$ in. *Panicles* shorter than or as long as leaves, with successively shorter branches; bracts ovate-oblong and rotundate enclosing the buds. *Drupe* $1\frac{1}{2}$–2 in., glabrous.—Nearly allied to *C. purpurascens*, but I cannot find stipules in any of the numerous specimens.

5. **C. purpurascens,** *A. W. Benn.*; extremities shortly pubescent-tomentose with rotundate-cordate stipules, leaflets 7–9 ovate-oblong to ovate-elliptical acuminate glabrous except puberulous midrib above purplish-glaucescent with minute scattered pubescence and 10–14 pairs of prominent lateral nerves with conspicuous transverse reticulation beneath, panicles terminal and from upper axils, pedicels (of ♂ fl.) very

short or 0 bracteate, calyx broadly 3-lobed, petals imbricate, stamens 6 confluent with short disk around the glabrous ovoid-subulate rudiment of ovary.

MALACCA, *Griffith.*

Leaves of flowering shoots ⅔–1 ft., leaflets 3–5 by 1½–2 in., petiolules ¼–⅓ in.; stipules ½–¾ in. broad (or larger). *Panicles* puberulous, as long as leaves; buds and ovate or rotundate bracts tomentose. *Fruit* not seen.

6. **C. nitidum,** *A. W. Benn.;* extremities obsoletely puberulous glabrate, stipules wanting at flowering, leaflets 5–7 oblong to elliptical acuminate glabrous, midrib prominent beneath but lateral nerves subdistant faint 7–10 pairs, reticulation obscure beneath, panicles terminal, drupe ellipsoidal with thick bony stone. *Wall. Cat.* 8546 (excepting specimens intermixed of a Connaracea ?).

SINGAPORE, *Wallich;* MALACCA, *Griffith, Maingay.*

Leaves of flowering branches 1 ft. more or less; leaflets 4–6 by 1½–3 in.; petiolule ⅓–¾ in. *Flowers* not seen. *Calyx* 3-lobed. *Drupe* 1½–2 in., glabrous.

†† *Leaflets serrulate.*

7. **C. rufum,** *A. W. Benn.;* extremities stout closely rusty-tomentose, leaves 1–2-feet (? exstipulate), rachis tomentose, leaflets 6–11 oblong shortly acuminate base rounded denticulate-serrate coriaceous, glabrous above except shortly tomentose midrib, closely tawny tomentose with 15-20 pairs of prominent lateral nerves and distinct reticulation beneath, flowers congested in sessile or shortly pedunculate bracteate inch-broad fascicles along the branches of panicle, calyx thick trifid, petals coriaceous exceeding calyx narrowly-imbricate, stamens 6, filaments apparently confluent at base, fruit ellipsoidal trigonous with a thick bony stone.

MALACCA, *Maingay, Griffith.*

Tree of medium size. *Leaflets* very coriaceous, upper larger varying to 6–8 by 2–2½ in., petiolule ¼–½ in., reticulation very prominent beneath. *Panicles* terminal, closely rusty-tomentose; buds enclosed in rotundate concave tomentose bracts. *Calyx-lobes* broadly ovate, obtuse. *Petals* tomentose outside except narrow covered margins. *Fruit* 2 in. long. (*Cotyledons* 3-partite. *Griffith.*)

** *Stamens monadelphous, distinct from disk. Buds cylindrical or clavate. Leaflets entire or serrulate.*—Pimela, *Lour.*

8. **C. grandiflorum,** *A. W. Benn.;* extremities tawny-pubescent, stipules subulate from near the base of the glabrous rachis, leaflets 7–9 ovate-lanceolate to elliptic-oblong acuminate glabrous or with few scattered hairs and 8–12 pairs prominent lateral nerves beneath, pedicels shorter than hairy broadly 3-lobed calyx, petals narrowly imbricate, stamens 6, filaments confluent in a tubiform sheath, ovary densely setose, style long, fruit subtrigonous, stone thick bony.

MALACCA, *Maingay.*

Leaves ⅔–1 ft. or longer; leaflets 3–4½ by 1–1¾ in.; petiolule ¼ in. more or less. *Flowers* hermaphrodite, ½ in. long, in compound tawny tomentose racemes collected in a terminal panicle. *Filaments* glabrous, confluent below. *Fruit* 1⅓ in., oblong-ellipsoidal, obtuse.

9. **C. pilosum,** *A. W. Benn.;* extremities thinly hirsute, stipules subulate hairy, leaflets usually 5 obovate- to oblong-elliptical or broadly elliptical shortly acuminate more or less undulate-dentate above or subentire glabrous and reticulate, thinly hirsute chiefly on the prominent reticulation beneath, lateral nerves 9–13 pairs, pedicels shorter than shallow 3-lobed

calyx, petals narrowly imbricate, stamens 6, filaments confluent ⅕–⅙ their length.

MALACCA, *Maingay.*

Leaves ¾-1 ft., leaflets 3–6 by 1¼–2¾ in., petiolule ¼ in. *Racemes* interrupted, rusty-pubescent or glabrate, from the uppermost axils, overtopped by the leaves; pedicels tomentose, not exceeding the cupuliform obscurely-lobed calyx. *Petals* tomentose. *Filaments* glabrous. *Rudiment of ovary* setose. *Fruit* not seen.—*Wall. Cat.* 8100, from Sincapore, leaves only, may belong here.

10. **C. hirtellum,** *A. W. Benn.;* extremities tawny-tomentose, leaves stipulate, leaflets 7–9 oblong-elliptical shortly and rather acutely acuminate denticulate toward apex, reticulate at length glabrous above except pubescent midrib, shortly hirsute-pubescent and strongly reticulate beneath, flowers tomentose fascicled in interrupted racemes from the upper axils, calyx 3-lobed, petals narrowly imbricate, filaments 6 confluent half their length, rudiment of ovary setose, fruit trigonous. *Wall. Cat.* 8102 and 9047.

PENANG, *Wallich.*

Leaves 1 ft. or more in length, rachis pubescent-tomentose, with a pair of linear-subulate ½-in. stipules near the base; leaflets varying from ovate- through oblong- to obovate-elliptical, upper 3½–6 by 1½–2½ in.; petiolules ¼ in. *Pedicels* scarcely exceeding calyx. *Flowers* ⅓–½ in. long. *Fruit* 1 in., glabrous, oblong-ellipsoidal, trigonous; stone hard, bony.—Nearly allied to *C. pilosum,* differing in indumentum, pubescent midrib above, the more triangular teeth of calyx, &c.

X 11. **C. strictum,** *Roxb. Hort. Beng.* 49; *Fl. Ind.* iii. 138; extremities at first densely rusty-tomentose, leaflets 7–9 (-15) ovate-oblong or varying from ovate to ovate-lanceolate acuminate denticulate-serrate or subentire glabrescent above more or less closely pubescent-tomentose with 10–15 pairs of prominent lateral nerves beneath, panicles tomentose from the upper axils interruptedly racemose, pedicels of ♂ fl. shorter than 3-lobed calyx, petals twice as long distinctly imbricate, filaments confluent half their length. *W. & A. Prodr.* 175; *Dalz. & Gibs. Bomb. Fl.* 52; *Bedd. Fl. Sylv.* i. 128.

WESTERN PENINSULA, Concan, Bababuden Hills, Anamallays, &c., *Dalzell, Beddome,* &c.

Tall straight tree. *Leaves* 1–1½ ft. long more or less on flowering branches, varying to 4 ft., stipules obsolete (stipulate, *Roxburgh,* who had seen only barren shoots); leaflets from 3–6 (–12) by 1½–2½ (5–) in. broad; petiolule ⅒–⅓ in. *Panicles* shorter than leaves, upper lateral branches short or flowers (of ♂) in sessile fascicles; ♀ fl. less crowded on stout longer pedicels marked with scar of small caducous bract. *Calyx* tomentose, campanulate, shortly and broadly 3-lobed. *Petals* thinly tomentose above. *Ovary* glabrate, equalling the stout style, rudiment in ♂ fl. setose. *Drupe* 1½–2 in., ellipsoidal or ovoid, tapering, with a thick bony stone.

12. **C. bengalense,** *Roxb. Hort. Beng.* 49; *Fl. Ind.* iii. 136; extremities rusty-pubescent glabrate with subulate stipules, leaflets 13–21 ovate-oblong or lanceolate acuminate glabrous?, panicles racemiform from upper axils, petals 3 imbricate, filaments confluent half their length, disk hirsute within the stamens, drupe ellipsoidal smooth.

SILHET and adjoining districts, *Roxburgh.*

Leaves 1–2 ft., leaflets subopposite, 3–6 by 1–2 in. *Panicles* shorter than or equalling the leaves (supra-axillary), buds cylindrical. *Calyx* cupuliform, 3-fid. *Petals* obovate-oblong. *Drupe* size of large olive, 1–3-celled, dark-purple pruinose, stone trigonous, thick, bony. *Cotyledons* contortuplicate.—I have seen no specimen. The description is from Roxburgh, l.c., and from his drawing, No. 2311.

13. **C. euphyllum,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 295; leaves 2–3-ft. glabrous, leaflets 9–10 subopposite ovate- or oblong-elliptical apiculate obtusely glandular-serrulate, base rounded or subcordate, lateral nerves 14–16 pairs rather prominent beneath, peduncle elongate naked below, flowers thinly tomentose, calyx obtusely 3-lobed glabrate, petals narrowly imbricate, filaments 6 confluent half their length enclosing a short fleshy lobed disk surrounding the ovary-rudiment.

South ANDAMAN ISLANDS, *Kurz.*

Upper leaflets 9–10 in.; petiolule ½ in.; stipules 0? *Panicle* 1½ ft. long; branches glabrous, naked below. *Calyx* campanulate, broadly 3-lobed. *Petals* oblanceolate. *Fruit* unknown.—Description in part from Kurz, l.c.

*** *Stamens inserted below margin of fleshy disk. Pedicels slender. Endocarp thin.*

14. **C. laxum,** *A. W. Benn.;* extremities leaf-rachis and inflorescence hirsute more or less with tawny or rust-coloured spreading at length deciduous setæ, leaves 1–2½ ft. (exstipulate?), leaflets 7–9 oblong or oblanceolate-oblong shortly and obtusely acuminate glabrous with 11–17 pairs prominent looping lateral nerves beneath, panicles elongate flexuose with alternate lateral branches, pedicels slender articulated equalling or exceeding the flower, calyx trifid, petals very narrowly imbricate glabrous, drupe ellipsoidal with thin bony 1-celled stone.

MALACCA, *Maingay.*

Leaflets ¼–⅝ ft. by 1½–2½ in., upper usually larger, lower third of rachis terete naked, usually loosely setose-hirsute towards the base. *Panicle* elongate, 1–2 ft., with sparse patent setæ, ultimate divisions often red- or rusty-tomentose. *Calyx* trifid, lobes obtuse triangular. *Petals* ovate, obtuse. (*Stamens* 6, inserted below the margin of thin fleshy disk, *Maingay.*) *Fruit* about 1½ by 1 in., ellipsoidal, 1-celled by abortion (rose-coloured; cotyledons digitate, *Maingay*).

**** *Stamens inserted outside margin of disk. Buds small, globose. Endocarp thin.*

15. **C. rubiginosum,** *A. W. Benn.;* leaves exstipulate?, leaflets 5–7 oblong-elliptical shortly and obtusely acuminate glabrous above thinly pubescent at length glabrate beneath with 10–13 pairs prominent lateral nerves incurved and nearly looping at the margin, ♂ buds globose, calyx entire, stamens 6, fruit ellipsoidal thinly drupaceous, stone crustaceous 1-seeded.

MALACCA, *Maingay.*

Extremities tawny hirsute-tomentose glabrescent. *Leaves* ½–1 ft.; leaflets 4–6 by 1½–2½ in.; petiolule ⅓–½ in. *Panicle* terminal; of ♂ fl. pyramidal, with sparse divergent branches simple below; pedicel equalling and dilated into short calyx. *Petals* deltoid, valvate, externally tawny-tomentose. *Fruit* 1 by ½ in. (bright yellow; cotyledons bright green, cleft on either side to the base into 5 linear segments, contortuplicate; radicle long, ascending, *Maingay*).

16. **C. Kadondon,** *A. W. Benn.;* extremities early glabrous (leaves exstipulate?), leaflets 7–9 elliptic-lanceolate obtusely acuminate entire glabrous or nearly so with 6–9 pairs subprominent incurved lateral nerves, petiolules slender, flowers hermaphrodite, calyx broadly 3- (4-) lobed, stamens 6, stigma in bud subsessile.

MALACCA, *Maingay.*

Leaves ½–1 ft.; rachis terete, nearly glabrous, lower ⅓–½ naked; leaflets 2½–4 by 1–1½ in., drying purplish brown; petiolule ½ in. *Panicle* corymbose, thinly tomentose, pedicels not exceeding the flower. *Petals* valvate. *Ovary* glabrous. *Fruit* unknown.

***** *Stamens inserted around and upon ovary-rudiment. Buds ellipsoidal ¼–⅓ in.*

17. **C. parvifolium,** *A. W. Benn.;* wholly glabrous or nearly so, leaflets 7 oblong lanceolate or elliptic acuminate, midrib prominent beneath, lateral nerves faint, panicle terminal, buds ellipsoidal subsessile on pedicels not exceeding cupuliform subentire calyx, petals imbricate, stamens inserted around and upon the ovoid-subulate ovary-rudiment.

MALACCA, *Maingay.*
Leaves of flowering branches ½ ft. more or less; leaflets 2–3½ by ¾–1⅓ in.; petiolule ⅛–⅙ in. *Buds* on expansion ¼–⅓ in. long, pubescent or glabrous. *Fruit* unknown.

18. **C. coccineo-bracteatum,** *Kurz Journ. As. Soc. Beng.* (1872) ii. 296; extremities softly pubescent, leaves glabrous 1–2 ft., stipules deeply divided segments rigid coarsely toothed, leaflets 7–9 shortly petiolulate oblong or ovate-oblong acuminate entire or setose-serrulate glabrous with about 10 pairs of lateral nerves and loose reticulation beneath, panicles puberulous with scarlet oblong acute bracts.

South ANDAMAN ISLANDS, *Kurz.*
Leaflets 5–7 in. long. Expanded flowers and fruit undescribed.

8. **SANTIRIA,** Blume.

Balsamiferous trees. *Leaves* alternate, stipulate, 3-foliolate or imparipinnate, firm; leaflets opposite, slightly oblique, entire. *Flowers* in axillary rarely terminal patently branched panicles; bracts usually obsolete; bracteoles minute. *Calyx* cupuliform, 3-lobed or -fid, valvate. *Petals* 3, valvate or subimbricate, much exceeding the calyx. *Disk* annular, fleshy, adnate. *Stamens* 6 (rarely fewer by abortion), distinct, often unequal, inserted on the margin or outside of the disk. *Ovary* 3-celled, with 2 ovules in each cell; style short, stigma capitate. *Drupe* ellipsoidal or subglobose, more or less laterally compressed on the ventral side, 1-celled, 1-seeded, stone crustaceous or woody. *Cotyledons* contortuplicate.—DISTRIB. Malayan Archipelago. Species probably 25.

SECT. I. **Icicopsis.** *Anthers* adnate.

1. **S. Planchonii,** *A. W. Benn.;* leaflets 11 glabrous on both surfaces ovate-oblong elliptic or oblong obtusely acuminate or shortly caudate-acuminate, base obliquely rounded, nervation inconspicuous above, lateral nerves weak often bifurcating before reaching the margin, panicle with numerous canescent lax slender ascending branches, bracts obsolete, pedicels shorter than the flowers, calyx-segments deltoid acute, stamens shorter than the petals.

MALACCA, *Griffith, Maingay.*
Tree; branchlets with pale-brown or ashy-grey somewhat striate bark, youngest palely pubescent. *Leaves* of flowering-shoots 8–12 in.; petiole 2–3 in., slightly flattened above, glabrescent; leaflets 3–4½ by 1¼–1¾ in., glaucescent beneath, petiolule ¼–⅓ in. *Panicle* 2–6 in., pedicels less than 1/12 in. *Flowers* with several minute very caducous bracteoles immediately beneath the glabrescent calyx. *Stamens* with broad striate filaments inserted just beneath the margin of the disk, spathulate above and with the anther-cells attached on their inner face. *Drupe* ⅓ in. long, ellipsoidal, somewhat late-

rally compressed on the ventral, gibbous on the dorsal side, purple, covered with pale bloom; style very oblique, but not basilar, as stated by Benth. and Hook. f. in Gen. Pl. i. 325.

SECT. II. **Santiria** proper. *Anthers* dorsifixed.

* *Panicle branched from base, or nearly so.*

2. **S. costata,** *A. W. Benn.;* leaflets 7 glabrous above pubescent beneath elliptic-oblong shortly obtusely caudate-acuminate, base obliquely acute, midrib prominent above pale, lateral nerves about 9 pairs inconspicuous above and very prominent beneath divaricate curving towards the margin, panicle pyramidal ferruginously pubescent, branches divaricating subtended by lanceolate obtuse bracts, pedicels as long as the flowers, calyx ultimately truncate-dentate, stamens about equalling the petals.

MALACCA, *Maingay.*

Tree; branchlets with pale ashy-grey bark; youngest branchlets, petioles and petiolules ochraceously pubescent. *Leaves* of flowering shoots 6–8 in., petiole 1 in. flat above; leaflets $3\frac{1}{2}$–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., petiolule $\frac{1}{3}$–$\frac{1}{2}$ in., transversely rugose, thickened at both ends. *Panicle* 3 in. long (occasionally with a peduncle $\frac{1}{3}$–$\frac{1}{2}$ in). *Flowers* in fascicles of about 4 on lateral branches of panicle, surrounded by several minute bracteoles; pedicels $\frac{1}{6}$ in. *Calyx* glabrescent. *Stumens* with slender filaments inserted beneath the margin of the disk. *Fruit* unknown.

3. **S. apiculata,** *A. W. Benn.;* leaves trifoliolate glabrous on both sides elliptic or elliptic-oblong shortly obtusely caudate-acuminate, base acute, midrib prominent above, lateral nerves weak bifurcating before reaching the margin, panicle narrowly pyramidal, glabrous branches ascending, bracts obsolete, pedicels twice as long as the flowers, calyx-segments deltoid acute, stamens shorter than petals, style completely basal in fruit.

MALACCA, *Maingay.*

Tree; branchlets with pale ashy-grey bark. *Leaves* of flowering-shoots, 6–8 in., petiole 2 in., striate, flat above; leaflets $2\frac{1}{2}$–4 by $1\frac{3}{4}$–2 in. broad, petiolule $\frac{1}{2}$–$\frac{3}{4}$ in., jointed at the apex. *Panicle* $\frac{1}{2}$–3 in. long (occasionally with a peduncle $\frac{1}{2}$ in.) pedicels $\frac{1}{6}$ in. *Bracteoles* minute. *Stamens* with slender filaments inserted beneath the margin of the disk, about equalling the capitate stigma. *Drupe* $\frac{1}{3}$ in. long, ovoid, the obtuse protuberance bearing the style completely basal, giving the drupe the appearance of an anatropous ovule; stone thin, fragile; fruit-pedicel $\frac{1}{4}$ in.

4. **S. puberula,** *A. W. Benn.;* leaflets 7–9 glabrous above minutely pubescent beneath elliptic-oblong shortly acuminate, base obliquely rounded, midrib and lateral nerves inconspicuous above, lateral nerves about 8 pairs prominent below curving towards the margin, panicle pyramidal lax few-flowered canescent, scurfy branches patent dividing only at the apex, bracts obsolete, pedicels as long as the flowers, calyx ultimately truncate-dentate, stamens rather shorter than petals.

MALACCA, *Maingay.*

Tree; branchlets with brown striate bark when young, as well as petioles and petiolules clothed with minute canescence. *Leaves* of flowering-shoots 6–8 in.; petioles $1\frac{1}{2}$–2 in., flat above; leaflets 3–$4\frac{1}{2}$ by $1\frac{1}{4}$–2 in., petiolule $\frac{1}{4}$ in., transversely rugose, slightly thickened at the apex. *Panicle* $2\frac{1}{2}$–4 in. long; pedicels $\frac{1}{12}$ in. long. *Bracteoles* minute. *Calyx* minutely pubescent. *Stamens* with slender filaments inserted beneath the margin of the disk. *Fruit* unknown.

5. **S. conferta,** *A. W. Benn.;* leaflets 13 firm glabrous and finely reticulate above clothed with minute rusty pubescence beneath more or less broadly lanceolate or oblong-lanceolate taper-pointed, base obliquely

rounded, lateral nerves about 10 pairs curved and weak towards margin, panicle pyramidal rather compact ferruginously-pubescent divaricately branched, bracts obsolete, pedicels shorter than the flowers, calyx ultimately truncate-dentate, stamens shorter than petals.

MALACCA, *Griffith, Maingay.*

Tree; branchlets with pale-brown irregularly striate bark when young, as well as petioles and petiolules clothed with ferruginous pubescence. .*Leaves* of flowering-shoots 12–18 in.; petiole 4–5 in., closely striate below, shallowly channelled above, petiolule $\frac{1}{3}$–$\frac{2}{3}$ in. slightly transversely rugose and thickened at either extremity. *Panicle* 3–4 in., pedicels $\frac{1}{25}$ in. *Bracteoles* minute, obtuse. *Calyx* pubescent. *Stamens* inserted beneath the margin of the disk. *Drupe* as in *S. apiculata*, but a more reddish purple when dry.

** *Panicle pedunculate.*

6. **S. lævigata,** *Blume Mus. Bot.* i. 211; leaflets 7–15 glabrous on both surfaces elliptic-lanceolate elliptic or oblong-acuminate, base acute or rounded, midrib prominent above, lateral nerves 12–18 pairs more or less divaricating, panicle shorter than leaves pyramidally branched, peduncle and branches minutely puberulous, bracts obsolete, pedicels as long as the flowers, calyx at length truncate-dentate, stamens about equalling petals, style nearly basal in fruit. Canarium lævigatum, *Miq. Fl. Ind. Bat.* vol. i. pt. 2, 648.

MALACCA, *Griffith, Maingay.*—DISTRIB. Sumatra.

A large tree; branchlets striate, with decurrent angles from the bases of the leaves and ashy-brown bark with minute white warts. *Leaves* of flowering shoots 10–18 in.; petiole 2–4 in., striate and channelled above; leaflets 4–7 by 1$\frac{1}{2}$–2 in., petiolule $\frac{1}{4}$–$\frac{1}{2}$ in. *Panicle* 6–9 in., peduncle 2$\frac{1}{2}$–4 in., pedicels about $\frac{1}{12}$ in. *Bracteoles* minute. *Calyx* minutely hispid, ultimately almost transversely truncate. *Stamens* with filaments dilated at the base, inserted just below the outer margin of the disk. *Drupe* subglobose, $\frac{1}{2}$ in. diam.—Blume has figured the stamens incorrectly as inserted at the base of the disk, as is proved by the examination of an authentic specimen.

7. **S. multiflora,** *A. W. Benn.*; leaflets about 7 glabrous above except the prominent tomentose midrib ferruginously pubescent beneath elliptic-oblong shortly acuminate, base obliquely rounded, lateral nerves about 15–18 pairs, panicle shorter than leaves pyramidally branched, peduncle and branches ochraceously pubescent, bracts caducous, pedicels as long as the flowers, calyx at length truncate-dentate, stamens about equalling the petals, style subterminal in fruit.

MALACCA, *Griffith, Maingay.*

Tree; young branchlets, pedicels and inflorescence ochraceously pubescent. *Leaves* of flowering shoots 6–12 in.; petiole 2–4 in., striate and flat above; leaflets 4–6 by 1$\frac{1}{2}$–2$\frac{1}{4}$ in., petiolule $\frac{1}{4}$–$\frac{1}{2}$ in. *Panicle* 4–6 in., peduncle $\frac{3}{4}$–1$\frac{1}{2}$ in., pedicels $\frac{1}{12}$ in. *Bracteoles* minute. *Calyx* minutely hispid. *Petals* covered with a glaucous bloom. *Stamens* with filaments slightly dilated at the base, inserted just below the outer margin of the disk. *Drupe* $\frac{1}{2}$ in. long, globosely cylindric, reticulate and pruinose when dry; stone woody; fruit-pedicel $\frac{1}{6}$ in. long, stout.—This agrees in everything except the small number of leaflets with *S. tomentosa*, Bl., which occurs in Sumatra, and with which it may eventually prove identical.

8. **S. Maingayi,** *A. W. Benn.*; leaflets 7–9 glabrous on both sides oblong-lanceolate shortly acuminate, base acute, lateral nerves about 10 curving towards the margin, panicle shorter than the leaves cymosely dichotomously branched, peduncle and branches minutely puberulous finally glabrescent, bracts obsolete, pedicels rather longer than the flowers, calyx-teeth deltoid obtuse, stamens shorter than the petals.

MALACCA, *Maingay.*

Tree; branchlets smooth, striate, pale brown. *Leaves* of flowering shoots 10–22 in.; petiole 3–6 in., striate and flat above; leaflets 5–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., petiolule $\frac{1}{3}$–$\frac{2}{3}$ in. thickened at the apex. *Panicle* 10–12 in., peduncle 4 in., pedicels $\frac{1}{12}$ in. *Bracteoles* very minute. *Calyx* and *petals* minutely puberulous and rather fleshy. *Stamens* inserted below the margin of the crenate disk. *Fruit* unknown.

9. **S. fasciculata,** *A. W. Benn.*; leaflets 7 glabrous on both surfaces elliptic or elliptic-oblong shortly obtusely cordate-acuminate, base acute, midrib prominent above, lateral nerves about 8 depressed above prominent below divaricate curving towards the margin, panicle exceeding the leaves with long slender filiform puberulous branches bearing small distant fascicles of minute flowers, bracts obsolete, calyx-lobes ovate acute, stamens shorter than the petals.

MALACCA, *Maingay.*

Tree; branchlets smooth with ashy-brown bark. *Leaves* of flowering shoots about 1 ft.; petiole 2 in., with 2 lateral edges, scarcely flattened above, leaflets 4–5 in., $1\frac{1}{2}$–$2\frac{1}{2}$ in. broad, petiolule about 1 in. transversely rugose thickened at either end. *Panicle* rather longer than leaves, peduncle 3–4 in. long, pedicels twice as long or shorter than flowers. *Bracteoles* obsolete. *Flowers* about $\frac{1}{25}$ in. long. *Calyx* minutely hispid. *Stamens* inserted on the outer margin of the disk. *Fruit* unknown.—This appears to agree very closely with the description of *S. virgata*, Bl., except that the leaves have the midrib tomentose beneath.

9. **TRIGONOCHLAMYS,** Hook. f.

A tree with pustulate tomentose-pubescent branches. *Leaves* alternate, imparipinnate with opposite petiolulate leaflets. *Flowers* polygamous. *Calyx* large, 3-partite, valvate, persistent. *Petals* 3, valvate, about equalling calyx. *Disk* annular. *Stamens* 6, inserted in the margin of the disk; filaments very short. *Ovary* 3-celled, nearly globose; style straight, short, stigma 3-lobed; ovules 2 in each cell, axile. *Drupe* obliquely globose, 1-celled. 1-seeded.

1. **T. Griffithii,** *Hook. f. in Trans. Linn. Soc.* xxiii. 170, t. xxvii.; leaflets about 13–15 elliptic-acuminate rather coriaceous with a very prominent midrib, panicle axillary, shorter than the leaves, flowers rufous-tomentose with 2 spathulate bracts at base of the pedicel, drupe glabrous about the size of a cherry.

MALACCA, *Griffith.*

10. **FILICIUM,** Thwaites.

A lofty tree with angular often scaly branches. *Leaves* imparipinnate, with opposite sessile leaflets and broadly-winged rachis. *Flowers* polygamous. *Calyx* 5-partite, imbricate, deciduous. *Petals* 5, small, imbricate. *Disk* 5-lobed, tomentose. *Stamens* 5, inserted within the disk, equal; filaments subulate, free. *Ovary* globose, 2-celled; style bent, stigma simple or 2-lobed; ovules solitary in each cell, pendulous. *Drupe* fleshy, usually 1-celled, 1-seeded.

1. **F. decipiens,** *Thwaites Enum.* 408; leaflets about 15 narrowly elliptical quite glabrous sometimes glaucous, wing of rachis spathulate between each pair of leaflets, drupe about the size of a large pea nearly globose glabrous. *Bedd. Fl. Sylv.* i. t. 129. Pteridophyllum decipiens,

Thwaites, l. c. 59, and in *Hook. Kew Journ. Bot.* vi. 66, t. i. B. Rhus decipiens, *W. & A. Prodr.* 172; *Wight Ill.* i. 184, t. 75.—*Burm. Fl. Zeyl.* t. 45.

WESTERN PENINSULA; throughout the Western Ghats ascending to 4–5000 ft., *Beddome;* CEYLON, in the central province, ascending to 3000 ft., *Thwaites.*

ORDER XXXVII. **MELIACEÆ.** (By W. P. Hiern, M.A.)

Trees or shrubs. *Leaves* alternate, exstipulate, usually pinnate rarely simple or bipinnate; leaflets opposite or alternate, usually quite entire and more or less oblique at base. *Flowers* hermaphrodite or polygamo-diœcious, regular, usually in axillary panicles. *Calyx* 3–6-lobed rarely entire or with free sepals, usually imbricated in bud. *Petals* 3–6, free or rarely connate at the base, sometimes adhering to the lower half of the staminal tube, valvate imbricated or contorted. *Stamens* 4–12, inserted outside the base of the hypogynous disk, filaments connate in a tube or rarely free; anthers erect, usually sessile on the tube, included or exserted, 2-celled, longitudinally dehiscing. *Hypogynous disk* tubular annular or obsolete, free or connate with the ovary. *Ovary* usually free, 2–5-celled; style single, stigma disciform or capitate; ovules 2, rarely more, collateral or superposed, raphe ventral, micropyle superior. *Fruit* capsular drupaceous or baccate. *Seeds* exalbuminous or sometimes with fleshy albumen, often enclosed in an aril.—DISTRIB. About 300 species, mostly tropical, widely spread over both hemispheres. Miquel enumerates 113 species as occurring in the Indian Archipelago.

Swietenia Mahagoni, *Linn.* (Mahogany) has been successfully cultivated near Calcutta and in Sikkim (*Brandis For. Flor.* 70); it is a native of the West Indies and Central Africa.

In the development of the flower of this Order the staminal-tube and the style are late in completing their growth.

Heynichia malleoides, *Kth. Ind. Sem. Hort. Berol.* 1844 *Coll. adnot.* 8, supposed to have come from East India, is a species of Moschoxylum, near M. elegans, *A. Juss.*, and probably came from South America.

TRIBE I. **Melieæ.** *Leaflets* often toothed. *Stamens* united into a tube. *Cells of ovary* 1–2-ovuled. *Seeds* not winged, albumen thin fleshy; cotyledons thin, foliaceous.

Leaves simple . . . . 1. TURRÆA.
Leaves trifoliolate pinnate or 2–3-pinnate.
  Flowers elongated. Style long.
    Petioles winged. Ovules collateral . . . . 2. NAREGAMIA.
    Petioles not winged. Ovules superposed.
      Disk tubular. Petals cohering half way. Fruit capsular, loculicidally 5-valved . . . . 3. MUNRONIA.
      Disk annular. Petals free. Fruit drupaceous, indehiscent 4. MELIA.
  Flowers globose. Style rather short . . . . 5. CIPADESSA.

TRIBE II. **Trichilieæ.** *Leaflets* entire. *Stamens* united into a tube (free in one species of *Walsura*). *Cells of ovary* 1–2-ovuled (2–5-ovuled in *Carapa*). *Seeds* not winged, albumen 0; cotyledons thick.

Flowers and staminal-tube oblong or linear. Style elongated.
  Capsule loculicidal. Leaves pinnate.
    Flowers oblong. Anthers short. Ovules 2 together, rarely solitary . . . . 6. DYSOXYLUM.
    Flowers linear or oblong. Anthers linear. Ovules solitary . 7. CHISOCHETON.
  Berry indehiscent. Leaves trifoliolate . . . . 8. SANDORICUM.

Flowers and staminal-tube globose or turbinate. Style short or obsolete.
  Anthers included in the staminal-tube or nearly so. Ovules 1–2 together. Seeds not angular.
    Anthers 5, isomerous . . . . 9. AGLAIA.
    Anthers 6–10; flowers diplostemonous.
      Berry indehiscent . . . . 10. LANSIUM.
      Capsule loculicidal . . . . 11. AMOORA.
  Anthers exserted, or filaments free. Ovules 1–2 together. Seeds not angular except *Beddomea*.
    Seeds arillate. Calyx 4–5-fid. Flowers small.
      Berry indehiscent, shortly tomentose . . . . . 12. WALSURA.
      Capsule loculicidal, glabrous . . . . . . 13. HEYNEA.
    Seeds exarillate. Calyx 4–5-partite. Flowers of moderate size . . . . 14. BEDDOMEA.
  Anthers included. Ovules 2–8 together. Seeds angular . . 15. CARAPA.

TRIBE III. **Swietenieæ.** *Stamens* united into a tube. *Cells of ovary* with numerous ovules. *Seeds* not winged.

Petals obovate, spreading. Staminal-tube cup-shaped. Disk wide. Ovary 5-celled . . . . 16. SOYMIDA.
Petals oblong, erect-patent. Staminal-tube cylindrical. Disk obsolete. Ovary 3-celled . . . . 17. CHICKRASSIA.

TRIBE IV. **Cedreleæ.** *Stamens* distinct. *Cells of ovary* 8–12-ovuled.

Petals oblong, erect. Stamens 4–6, sometimes with alternating staminodes. Ovary 5-celled. Albumen thin fleshy; cotyledons subfoliaceous . . . . 18. CEDRELA.
Petals unguiculate, spreading. Stamens 10. Ovary 3-celled. Albumen wanting; cotyledons plano-convex . . . . . 19. CHLOROXYLON.

1. **TURRÆA,** Linn.

Trees or shrubs. *Leaves* simple, quite entire or obtusely lobed. *Peduncles* axillary, with numerous small bracts at base, bearing elongated white or yellow flowers. *Calyx* campanulate, 5–4-fid. *Petals* 5–4, elongated, spathulate, imbricated in bud, free, diverging in full flower. *Staminal-tube* elongated, toothed at the apex; anthers 10 or 8, short, inserted just within the mouth, alternating with the teeth. *Disk* annular or obsolete. *Ovary* 5- or more-celled; cells opposite the calyx-lobes when equal in number to them, with 2 superposed ovules; style elongated, exserted, stigma capitate. *Capsule* 4- or more-celled, loculicidal; valves woody or coriaceous, separating from the winged axis. *Seeds* with a broad ventral hilum, albumen fleshy; embryo foliaceous.—DISTRIB. A genus of 12–16 species, confined to tropical Asia, and tropical and South Africa.

1. **T. virens,** *Linn. Mant. Plant. alt.* 237; glabrate, shining, leaves elliptic-oblong subacuminate emarginate coriaceous, base obtuse, flowers yellow, style just exserted, capsule hairy. *Sm. Pl. Ic.* t. 10; *not of Hellenius; Grah. Cat. Bomb. Pl.* 31; *Benn. Pl. Jav. Rar.* 181; *Dalz. & Gibs. Bomb. Fl.* 36. X

WESTERN PENINSULA; amongst lava heaps, *Kœnig;* common on the Ghats, *Dalz. & Gibs.*

An evergreen shrub, 3–4 ft. high, or a tree. *Leaves* 2½–3⅝ by 1–1⅜ in., shortly petioled, margins slightly revolute, paler beneath. *Flowers* 1–1¼ in. long, in axillary or lateral clusters, shortly peduncled. *Calyx* shortly 5-fid, hairy. *Staminal-tube* about 1 in. long, with 10 lanceolate teeth. *Ovary* 5-celled. *Capsule* $\frac{1}{8}$ in. long, hairy. *Seeds* not winged.

2. **T. villosa,** *Benn. Pl. Jav. Rar.* 182; more or less pubescent with short hairs, leaves elliptic or ovate shortly acuminate thin, base obtuse or cuneate, flowers white, style far exserted, capsule glabrate. *Wight Ic.* t. 1593. Euonymus (sp.) *Beddome Flor. Sylv. Anal. Gen.* lxiv.

WESTERN PENINSULA; on the Anamallay and Mahableshwur hills; GUZERAT, at Dolra, *Hove in Hb. Banks.*

A large shrub or small tree. *Leaves* in flower usually about $1\frac{1}{2}$ in., in fruit 2–4 in. and sometimes glabrate, entire, shortly petioled. *Flowers* sweet-scented, 1–$1\frac{1}{2}$ in. long, in axillary clusters or short racemes, 3–6 together, about double the length of the peduncles. *Calyx* short, pubescent. *Staminal-tube* $\frac{2}{3}$–1 in. long, glabrous as well as the petals; teeth very short. *Ovary* 5-celled. *Capsule* subglobose, about $\frac{1}{2}$ in. long. *Seeds* not winged.

2. NAREGAMIA, W. & A.

A small glabrous and shining undershrub. *Leaves* trifoliolate. *Peduncles* axillary, solitary, 1-flowered. *Calyx* small, campanulate, 5-cleft, deciduous. *Petals* 5, free, elongate-spathulate, imbricated in bud, at length spreading above. *Staminal-tube* elongated, inflated above, obsoletely 10-crenate at the mouth; anthers 10, terminal, shortly oblong, inserted at the crenatures of the mouth, exserted, setaceous-apiculate. *Disk* annular. *Ovary* 3-celled, ovules 2 collateral in each cell, pendulous; *style* filiform, stigma capitate. *Capsule* ovoid-globose, 3-lobed, 3-celled, loculicidally 3-valved; valves separating from the 3-winged axis. *Seeds* 2 in each cell, albumen fleshy; embryo foliaceous.—DISTRIB. One Indian species, represented in Angola, West Tropical Africa by a shortly hairy form scarcely likely to prove specifically distinct.

1. **N. alata,** *W. & A. Prodr.* i. 117; leaflets sessile cuneate-obovate quite entire or obtusely lobed, common petioles winged. *Wall. Cat.* 9038; *Grah. Cat. Bomb. Pl.* 30; *Dalz. & Gibs. Bomb. Fl.* 36; *Drury Ind. Fl.* i. 161; *Wight Ic.* t. 90. N. dentata, *Miq. in Pl. Hohenack.* No. 79. Turræa alata, *Wight ex W. & A. l.c.*—*Rheede Hort. Mal.* x. t. 22.

WESTERN PENINSULA; or the Western Ghats from the Concan southwards.—DISTRIB. Angola (a pubescent form).

Branches erect or decumbent, from a few inches to 2 ft. long. *Leaves* 1–4 in. long; terminal leaflets rather larger than the lateral ones and about the length of the common petiole. *Flowers* 1–$1\frac{1}{4}$ in. long, quite white, longer than the peduncles. *Style* yellow.

3. MUNRONIA, Wight.

Shrubs or undershrubs with trifoliolate or unequally pinnate leaves, entire or coarsely toothed leaflets, elongated flowers, and axillary few-flowered peduncles. *Calyx* 5-partite, short at least in flower, persistent, subfoliaceous. *Petals* 5, elongate-spathulate, cohering half way. *Staminal-tube* adnate below to the corolla, cylindrical, 10-toothed at the apex; anthers 10, terminal, alternating with the teeth, setaceous-apiculate. *Disk* membranous, tubular, sheathing the ovary and base of the style. *Ovary* 5-celled; cells opposite the sepals, 2-ovuled; style elongated, slender, stigma capitate; ovules superposed. *Capsule* depressed-globose, 5-lobed, coriaceous, loculicidally 5-valved; valves separating from the 5-winged axis.

Seeds winged, albumen thin.—DISTRIB. Three species confined to India and the Malay Archipelago.

1. **M. pumila,** *Wight Ic.* t. 91; *Ill.* i. 147; leaflets 3 rarely 4–5 elliptic-lanceolate terminal one longer, peduncles axillary few-flowered crowded near the top of the short stem. *Thwaites Enum.* 59. Melia pumila, *Moon Cat.* 35.

CEYLON; not uncommon in the warmer parts of the Island.

More or less hirsute, 3–6 in. above the ground; *leaves* about as long; petiole scarcely half as long; lateral leaflets subsessile; terminal one 1½–3½ in. long. *Flowers* 1¼–1½ in. long, white, somewhat hairy outside. *Peduncles* short, bracteate. *Staminal-tube* with subulate teeth. *Fruit* ⅜ in. diam., hairy.—Much valued in India as a medicinal plant.

2. **M. Wallichii,** *Wight Ill.* i. 147; leaflets 5–9 usually 7 opposite or subopposite lanceolate or ovate lateral ones very shortly petioled, base obliquely rounded or rarely cuneate, peduncles axillary bearing a few fascicled flowers crowded at the top of the stem. Turræa pinnata, *Wall. Pl. As. Rar.* ii. 21, t. 119. M. neilgherrica, *Wight Ill.* i. 147, t. 54.

EASTERN TROPICAL HIMALAYA, in Sikkim. KHASIA MTS. NILGHIRI MTS. at Koondah Ghat.

A shrub. *Leaves* approximated at the ends of the branches, 6–12 in.; leaflets 1-5 in. by ⅔–1½ in.; petiole 2–4 in. *Flowers* 1–1¼ in. long, pale rose or white, hairy outside. *Peduncles* 1 in. long, hairy, bent downwards after flowering, bracteate. *Staminal-tube* with short subulate teeth. Fruit ½–¾ in. diam., hairy.

4. MELIA, Linn.

Trees with pinnate or 2–3-pinnate leaves, toothed or entire leaflets and panicled axillary flowers; pubescence often stellate-mealy. *Calyx* short, 5-6-lobed, imbricated. *Petals* 5–6, free, spathulate-oblong, patent, imbricated in bud. *Staminal-tube* cylindrical, dilated at base and apex, 10- or 12-striate and -toothed; anthers 10 or 12, included or partly exserted, short, inserted near apex. *Disk* annular. *Ovary* 3–6-celled; cells alternate to the sepals when equal in number to them; *style* slender, nearly as long as the tube, stigma capitate; ovules 2, superposed. *Fruit* drupaceous. *Seeds* with thin fleshy albumen; cotyledons foliaceous.—DISTRIB. A genus containing scarcely more than the following five species.

Melia latifolia, in Griff. Itin. Notes, p. 402, is a misprint for *Melica latifolia*, Roxb.

* *Leaves* simply pinnate.

1. **M. tomentosa,** *Roxb. Hort. Beng.* 90; *Fl. Ind.* ii. 394; leaves simply pinnate, leaflets subsessile 20 or more opposite lanceolate acuminate needle-pointed firmly coriaceous, base obtuse, panicles spike-like on long peduncles, flowers 5-merous, teeth of staminal tube linear-oblong notched about equalling the anthers, ovary 5-celled.

PENANG, *Roxburgh.*

A large tree, with the young parts petioles lower surface of leaflets bracts calyx exterior of petals interior of staminal-tube ovary and style downy. *Leaves* 6 ft. or more long continuing to expand leaflets at the apex; leaflets ranging up to 1 ft. *Flowers* pretty large, very numerous, crowded. *Bracts* subulate. *Calyx* cup-shaped, subentire. *Young fruit* 5-celled, with 1 seed in each cell.—There is a coloured drawing of this plant amongst Roxburgh's drawings in the Kew Herbarium, but no specimen.

2. **M. excelsa,** *Jack in Mal. Misc.* i. 12; leaves simply pinnate, leaflets numerous (19) subopposite or alternate ovate-oblong rather obtusely acuminate quite entire glabrous, base very oblique subauriculate, panicle ascending about equalling the leaves, flowers 5-merous, calyx short with rounded sepals, petals puberulent outside, staminal tube 10-furrowed obtusely 10–20-toothed, anthers 10 somewhat exserted, style rather thickly filiform, ovary 3-celled. *Griff. Notul.* iv. 499; *Hook. Bot. Misc.* i. 281; *Wall. Cat.* 1253, b *non* B.

PENANG, *Jack, Wallich*; MERGUI, *Griffith* (cult. ?)

A lofty tree of 50 ft. *Leaves* crowded at the ends of the branches, 2–2½ ft.; petiole terete, thickened and somewhat scaly at base; leaflets 3–6 by 1¼–2 in., petiolules ⅛–⅙ in. *Pedicels* short, bracteolate. *Flowers* white, ⅙–⅕ in. long. *Staminal-tube* glabrous outside. *Ovary* glabrous.

3. **M. Azadirachta,** *Linn. Sp. Pl. ed.* i. 385; leaves simply pinnate, leaflets 9–15 opposite subopposite or alternate lanceolate acuminate oblique or subfalcate serrate glabrous shortly petioluled sometimes sublobed near the obtuse base, flowers 5-merous, calyx 5-fid with obtuse or rounded lobes, petals shortly ciliate, anthers nearly equalling the obtuse teeth of the staminal tube, ovary 3-celled, fruit 1-celled 1-seeded. *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 394; *Griff. Notul.* iv. 500; *Wall. Cat.* 1251; *Bedd. Fl. Sylvat.* t. 14; *scarcely of Gærtner.* M. parviflora, *Moon Cat.* 35. M. indica, *Brandis For. Flor.* 67. Azadirachta indica, *Adr. Juss. in Mém. Mus.* xix. 221, t. 13, f. 5; *W. & A. Prodr.* i. 118; *Wight Ic.* t. 17; *Grah. Cat. Bomb. Pl.* 30; *Dalz. & Gibs. Bomb. Fl.* 36.—*Rheede Hort. Mal.* iv. t. 52.

A common tree throughout the greater part of INDIA, often planted, as elsewhere in hot climates.

A large tree of 40–50 ft., with a straight trunk. *Leaves* 8–15 in., crowded near the ends of the branches; leaflets 1–3 by ½–1½ in. *Flowers* white, honey-scented, ⅙–⅕ in. long. *Drupe* oblong, ½–¾ in. long.—The "Neem;" the seeds supply oil: see *Buchanan, Journ. Madr.* i. 9; a gum is also said to exude from the tree, *Buch. l.c.* 188. The wood resembles Mahogany, and the bark is very bitter.

** *Leaves twice or three times pinnate.*

4. **M. Azedarach,** *Linn. Sp. Pl. ed.* i. 384; leaves bipinnate occasionally tripinnate, ultimate leaflets 3–12 opposite subopposite or alternate ovate or lanceolate serrate or entire acuminate, base more or less oblique, flowers usually 5-merous, calyx deeply lobed lobes lanceolate-oblong, petals puberulent, anthers nearly equalling the linear-lanceolate teeth of the purple quite or nearly glabrous staminal tube, ovary 5-celled, fruit with 5 or fewer cells and seeds. *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 395; *Wight Ic.* t. 160; *Wall. Cat.* 1250; *Boiss. Fl. Orient.* i. 954; *W. & A. Prodr.* i. 117; *Adr. Juss. in Mém. Mus.* xix. t. 13, f. 4; *Bot. Mag.* t. 1066; *Bedd. Fl. Sylvat.* t. 13; *Brandis For. Flor.* 68. M. sempervirens, *Sw. Prodr.* 67; *Bot. Reg.* t. 643; *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 395; *Wall. Cat.* 1252; *Dalz. & Gibs. Bomb. Fl. Suppl.* 15. M. Bukayun, *Royle Ill. Bot.* 144; *Griff. Itin. Notes* 355, 403.

Commonly cultivated in India; wild in the sub-Himalayan tract, alt. 2–3000 ft.—DISTRIB. Persia, China, (*Roxb.*)—Cult. elsewhere.

A tree from 40 ft. downwards with a short erect trunk and broad crown. *Leaves* 9–18 in.; leaflets ½–3 by ⅙–1¼ in. *Flowers* lilac, ¼–⅓ in. long, honey-scented. *Drupe* subglobose, ½–¾ in. diam.—Numerous synonyms not being Indian are omitted. Wood hard finely marked; the seeds are used to make rosaries.

5. **M. dubia,** *Cav. Diss.* (vii.) 364 (1789); leaves bipinnate or occasionally tripinnate, ultimate leaflets 2–11 opposite ovate or oblong-lanceolate entire or crenate-serrate acuminate, base more or less oblique, panicles mealy with stellate hairs rather dense, calyx-lobes ovate, petals mealy, anthers exceeding the numerous short subulate teeth of the hairy mouth of the white staminal tube, ovary 5-celled, fruit with 5 or fewer cells and seeds. M. composita, *Willd. Sp. Pl.* ii. 559 (1799), *not of De Candolle; W. & A. Prodr.* i. 117; *Dalz. & Gibs. Bomb. Fl.* 36; *Thwaites Enum.* 59; *Bedd. Fl. Sylvat.* t. 12; *Brandis For. Flor.* 69. M. superba, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 396; *Wall. Cat.* 1254. M. robusta, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 397. M. australasica, *Adr. Juss. in Mém. Mus.* xix. 257. M. æthiopica, *Welw. Apontam. Phyto-geogr. Prov. Angola,* 584. M. Bombolo, *Welw.* l.c. 561. M. argentea, *Hb. Ham. ex Wall. Cat.* 1254, C.

The EASTERN and WESTERN PENINSULAS; BIRMA and CEYLON; wild and cultivated. —DISTRIB. Tropical Asia, Australia, and Angola.

A large handsome tree. *Leaves* 9–24 in.; leaflets ¾–3 by ¼–1½ in. *Flowers* greenish-white, fragrant, ¼–⅓ in. long. *Drupe* ellipsoidal, ½ in. or more long.—By the kindness of Dr. Roeper, Professor of Botany at the University of Rostock, I have been enabled to examine the original specimen of M. dubia, *Cav.*, and to ascertain its identity with M. composita, *Willd.*

5. **CIPADESSA,** Blume. (*Mallea,* Juss.).

Shrubs or small trees with odd-pinnate leaves, opposite or subopposite coarsely serrate or entire leaflets, axillary peduncled panicles and subglobose flowers. *Calyx* small, cup-shaped, 5-toothed. *Petals* 5, oblong, rather short, spreading, free, valvate in bud. *Staminal tube* deeply 10-lobed, adnate below to the disk, lobes linear, bifid at the apex; anthers short, inserted between the teeth, subapiculate. *Disk* shortly cup-shaped, wholly adnate to the base of the staminal tube. *Ovary* 5-celled; cells alternate with the calyx-lobes; style rather short, stigma clavate-capitate; ovules two, collateral, pendulous. *Drupe* slightly fleshy, 5-ribbed, 5-celled; ribs alternate with the calyx-lobes; cells 1–2-seeded. *Seeds* with fleshy albumen; embryo subfoliaceous.—DISTRIB. A genus of 2 species, limited to India and the Malay Archipelago.

1. **C. fruticosa,** *Blume Bijd.* 162; leaflets 7–11 ovate or elliptic entire or coarsely serrate pubescent on the nerves beneath, ovary glabrous. C. baccifera, *Miq. in Ann. Mus. Lugd.-Bat.* iv. 6. C.? subscandens, *Miq.* l.c. 7. Melia baccifera, *Roth Nov. Sp.* 215. Ekebergia indica, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 392; *Wall. Cat.* 1256. E.? integerrima, *Wall. Cat.* 1257. Mallea Rothii, *Adr. Juss. in Mém. Mus.* xix. 222, t. 13, f. 6; *W. & A. Prodr.* i. 118; *Grah. Cat. Bomb. Pl.* 31; *Thwaites Enum.* 60; *Dalz. & Gibs. Bomb. Fl.* 37; *Bedd. Fl. Sylv. Anal. Gen.* liv. t. 8, f. 5. M. integerrima, *Wall. ex Voigt Hort. Sub. Calc.* 134. M. subscandens, *Teysm. & Binnend. in Nat. Tidjdschr. Ned. Ind.* xxvii. 39. Melia montana, *Hb. Madr. ex Wall. Cat.* 1256, D.

WESTERN PENINSULA; from the Concan and Circars southwards to CEYLON.—DISTRIB. Java.

A much branched shrub, erect or in dense moist forests somewhat scandent. *Leaves* 3–10 in.; leaflets 1–3½ by ½–1½ in., shortly petiolulate. *Flowers* ⅛–⅙ in. long; panicles mostly on long peduncles. *Fruit* ⅕–¼ in. diam.

6. **DYSOXYLUM,** Blume.

Trees, mostly glabrous. *Leaves* pinnate; leaflets quite entire, opposite subopposite or alternate, more or less acuminate at the apex and oblique at the base, coriaceous. *Flowers* paniculate, hermaphrodite. *Calyx* 4–5-fid, dentate or partite or subentire, imbricated, caducous. *Petals* 4–5, oblong, spreading, valvate or slightly imbricated. *Staminal tube* cylindrical, dentate or crenulate at mouth; anthers short, 6, 8 or 10, included or half exserted. *Disk* tubular, equalling or twice the length of the ovary, crenulate or entire at the mouth. *Ovary* usually 3–4-celled; style about equalling the staminal tube; ovules usually 2 in each cell. *Capsule* globose or pear-shaped, coriaceous (often thickly so), 1–4-celled, loculicidal; seeds arillate or exarillate, exalbuminous.—DISTRIB. Species about 40, many in the Malay Archipelago, and a few in Australia and New Zealand.

The Indian species appear to be endemic. Many species emit an alliaceous odour.

SECT. I. *Calyx* cup-shaped, subentire, about half the length of the flower.

1. **D. binectariferum,** *Hook. f. ex Bedd. in Trans. Linn. Soc.* xxv. 212; pallid, leaflets 5–9 alternate elliptic acuminate glabrous, panicles nearly glabrous much shorter than the leaves, pedicels shorter than the 4-merous obsoletely tomentose flowers, calyx thick urceolate-cupshaped subentire, petals valvate except the apex, disk glabrous inside scarcely so outside twice as long as the 4-celled shortly hairy ovary, style very shortly hairy, fruit obovoid somewhat pyriform or subglobose nearly glabrate or puberulous. Guarea binectarifera, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 240; *Wall. Cat.* 1260; *Grah. Cat. Bomb. Pl.* 31. D. macrocarpum, *Thwaites Enum.* 60; *Beddome Fl. Sylv.* t. 150; *Anal. Gen.* liv.; *not of Blume.* G. Gotadhora, *Buch. Ham. in Edinb. Mem. Wern. Soc.* vi. 307; *Wall. Cat.* 4884, *excl. lett.* B. Epicharis exarillata, *Arn. ex W. & A. Prodr.* i. 120, *not of Nimmo.* ? G. Amaris, *Hamilt.* l.c. 308.

KHASIA MTS. and ASSAM; WESTERN PENINSULA from the Concan southwards; CEYLON (? Sikkim Himalaya and S. Andaman Islds.).

A tree 30 ft. high or more. *Leaves* 9–18 in.; leaflets 2½–7 by 1–3 in.; petiolules ⅛–⅜ in. *Flowers* ⅜ in., pale green; calyx nearly half the length of the flower; staminal tube somewhat mealy on both sides. *Fruit* 2½ in. long, reddish, 4-celled, 4-seeded. *Seeds* polished, dark purple.—The form with smaller and narrower leaves is the var. β of Dr. Thwaites. Amoora ficiformis, *Wight Illustr. Ind. Bot.* i. 147, closely resembles the Ceylon specimens, and may be synonymous with this species.

SECT. II. *Calyx* 4–5-fid or -partite or -sepalous, mostly short.

* *Flowers panicled.*

† Ovary glabrous.

2. **D. brevipes,** *Hiern;* leaflets 5–11 opposite or alternate elliptic or ovate-oblong acuminate glabrous, ultimate pedicels shorter than the glabrous flowers, calyx small cup-shaped irregularly 4-toothed, petals (3-) 4, disk exceeding the 3–4-celled glabrous ovary, fruit pear-shaped 4-valved.

MALACCA, *Maingay.*

A tree. *Leaves* 8–24 in.; leaflets 3–9 by 1–2 in., sometimes obscurely pellucid-punctate; lateral veins more or less depressed on the upper surface; petiolules ⅙–½ in. *Flowers* ⅙–⅕ in., white, with a strong alliaceous smell; petals distinctly but slightly imbricated at the margin; staminal tube pilose inside; connective obtusely apiculate; ovary glabrous; style glabrous, smooth, stigma discoid flattened at apex, its base surrounded by a viscid ring. *Ovules* 2 together, superposed. *Fruit* brownish-orange, 1½–2 in. long; seeds attached by a broad ovoid hile to the axis; testa externally of a chestnut colour.

†† Ovary more or less hairy.

‡ *Disk densely hairy at the mouth.*

3. **D. thyrsoideum,** *Griff. mss. sub Hartighsea;* leaflets 5–9 more or less alternate elliptic or oblong acuminate glabrous shining, panicles divaricately branched, ultimate pedicels about equalling the glabrous 4–5-merous flowers, calyx small cup-shaped or nearly flat irregularly toothed, disk hairy on both sides especially at the mouth fleshy truncate rather exceeding the 3-celled slightly hairy ovary, fruit obovoid.

Malacca, *Griffith* (*Kew distrib.* 1053).

A tree. *Leaves* 12–16 in.; leaflets 4–10 by 2–3¼ in.; lateral veins obscurely depressed on the upper surface; petiolule ¼–⅓ in. *Flowers* ⅙ in., white. *Fruits* fleshy, 2–3-lobed, umbilicate, nearly 1 in. long. *Fruiting peduncles* stout, woody. *Style* robust, stigma discoid sub-3-lobed. *Seeds* exarillate.

4. **D. procerum,** *Hiern;* leaflets 7–10 alternate or opposite elliptic or oblong abruptly acuminate glabrous, branches of elongated panicle spreading, ultimate pedicels very short, bracteate near the apex, calyx shortly cup-shaped 4–5-toothed, corolla appressedly pubescent 4–5-merous, anthers 8 or 10, disk twice the length of the 3–4-celled hairy ovary hairy at the apex and inside, fruit pyriform-globose, pericarp thick, seeds arillate. Guarea procera, *Wall. Cat.* 1261. G. oblonga, *Wall. Cat.* 1262. G. Gobara, *Hamilt. in Mem. Wern. Soc.* vi. 306 (1832); *Wall. Cat.* 4885. Hartighsea Gobara, *W. & A. ex Voigt Hort. Sub. Calc.* 136. *Cfr.* Guarea acuminata, *Wall. Cat.* 1263, *Cfr.* G. disyphonia, *Griff. Notul.* iv. 503.

From Assam, the Khasia Mts., and Cachar to Tenasserim.

A large tree. *Leaves* 1–2½ ft.; leaflets 4–14 by 2–6 in.; petiolule ¼–½ in. *Flowers* ⅜–½ in.; petals valvate or very slightly imbricate; staminal tube glabrous. *Fruit* 2 by 1½ in., 3–4-celled.

‡‡ *Disk glabrous at the mouth or nearly so.*

5. **D. grande,** *Hiern;* puberulent, leaflets 12 alternate oblong caudate-acuminate base rounded, panicles about equalling leaves, flowers shortly pedicelled clustered 4-merous, calyx short, staminal tube thinly pubescent on both sides 8-toothed teeth bifid, disk shortly tubular glabrous outside rather exceeding the hairy 4-celled ovary. Guarea grandis, *Wall. Cat.* 4883.

Eastern Bengal; at Silhet (*Wall.*).

Leaves 2 ft.; petiole 5½ in. long; leaflets 5–9 by 2½–3 in.; petiolules ¼ in. *Flowers* ⅙ in. long.

6. **D. Maingayi,** *Hiern;* leaflets 5–7 opposite or subopposite elliptic obtusely acuminate glabrous base cuneate, panicles short not much branched, flowers about equalling the pedicels 5-merous, calyx short flattish very shortly toothed, staminal tube obtusely crenate, anthers 10, disk just exceeding the hairy 4-celled ovary.

Malacca, *Maingay.*

Leaves 6–9 in., pale; leaflets 2½–5 by 1–2 in.; lateral petiolules short, terminal ½ in. *Panicles* 1½ in. long. *Petals* somewhat hairy outside, adnate in bud with the glabrous staminal tube, at length free, ¼ in. long. *Disk* glabrous outside, hirsute inside, 5-toothed. *Style* glabrous except the base.—According to Dr. Maingay's mss., the ovary is 5-celled, each cell opposite a calyx-lobe and containing 2 collateral ovules.

7. **D. Hamiltonii,** *Hiern;* shoots tawny velvety, leaflets 9–17 opposite or subopposite oblong acuminate velvety on the midrib beneath, panicles lax axillary shorter than the leaves, pedicels slender about equalling or shorter than the flowers, calyx very small 4-partite with rounded concave imbricated lobes pubescent, petals 4 glabrous, staminal tube pubescent on both sides, anthers 8, disk glabrous on both sides twice the length of the ovary, style slender pubescent below glabrous above, ovary pubescent 3-celled. Guarea mollis, *Wall. mss.* G. paniculata, *Wall. Cat.* n. 4882, *not of Roxb.* Epicharis mollis, *Wall. ex Voigt Hort. Sub. Calc.* 135. G. Alliaria, *Hamilt. in Mem. Wern. Soc.* vi. 305 (1832) *excl. syn. Rumph.* Hartighsea Alliaria, *Arn. ex Voigt Hort. Sub. Calc.* 136.

ASSAM and SILHET.

A large tree. *Leaves* erect, 15–20 in.; leaflets 4 by $1\frac{1}{5}$ in.; petiolules $\frac{1}{8}$ in. *Inflorescence* 6 in. long and wide; flowers $\frac{1}{4}$ in. long, greenish-white.

8. **D. malabaricum,** *Bedd. mss.;* leaflets about 8 subopposite ovate or subelliptic acuminate obsoletely puberulent base cuneate shortly petioluled, panicles many-flowered puberulent, pedicels short, flowers 4-merous, calyx cleft halfway short, disk short mouth not very hairy, ovary shortly pubescent 4-celled, ovules 2 together collateral, fruit globose both ends pointed. Dysoxylum (sp.), *Bedd. in Trans. Linn. Soc.* xxv. 212; *Fl. Sylv. Anal. Gen.* p. liv.

WESTERN PENINSULA; Mountains of Kurz and Travancor, alt. 2–3000 ft., *Beddome.*

An immense tree. *Leaves* pallid, $1\frac{1}{2}$ ft.; leaflets 5–8 by $1\frac{2}{3}$–$2\frac{1}{3}$ in.; petioles angular, $4\frac{1}{2}$ in.; petiolules $\frac{1}{3}$ in. *Flowers* $\frac{1}{3}$ in. *Anthers* short. *Fruit* 2 in. diam., verrucose, longitudinally lined, nearly glabrous, bright yellow when ripe, 3–4-seeded. *Seeds* bluntly 3-sided, attached by their whole inner face to the central placenta; testa reddish-brown; cotyledons green.—Called Porapà by the Kaders on the Anamallays.

** *Flowers racemose or spicate.*

† Leaflets alternate.

9. **D. pallens,** *Hiern;* leaflets 5–10 alternate oblong or elliptic narrowly acuminate glabrous, inflorescence axillary racemose, pedicels not exceeding the closely puberulent 4-merous flowers, calyx shortly cup-shaped 4-fid, anthers 8, disk glabrous on both sides coarsely toothed about equalling the hairy 3- (–2)-celled ovary, style shortly hairy below, fruit pyriform, seeds exarillate?

SIKKIM HIMALAYA (*Herb. Griff.*); MISHMI and KHASIA MTS., *Griffith.*

A small or moderate-sized tree; shoots pale. *Leaves* 9–32 in.; leaflets 3–8 by $1\frac{1}{2}$–3 in.; petiolule $\frac{1}{4}$–$\frac{1}{3}$ in. *Flowers* $\frac{1}{3}$ in., greenish; calyx $\frac{1}{10}$–$\frac{1}{6}$ in. long; petals valvate; staminal tube glabrous on both sides, obtusely 6–8-toothed. *Fruit* $1\frac{1}{3}$ by 1 in., slightly pubescent.

10. **D. Beddomei,** *Hiern;* leaflets 7–9 alternate glabrous submembranous ovate- or elliptic-oblong narrowly and obtusely acuminate base oblique obtuse or cuneate, inflorescence axillary spicate somewhat branched near the base, flowers subsessile or very shortly pedicelled 4-merous puberulent, calyx very short, teeth short obtuse, staminal tube puberulent on both sides, disk glabrous exceeding the hirsute ovary.

SOUTH TRAVANCOR, *Beddome.*

A middling-sized tree; young parts puberulent. *Leaves* pale-green, 12–15 in.; leaflets 4–6 by $1\frac{1}{2}$ to 2 in., midrib and lateral veins pale beneath; petiolules $\frac{1}{5}$–$\frac{1}{4}$ in. *Inflorescence* 3–6 in., 1–2 in. wide. *Flowers* $\frac{1}{3}$ in. long. *Petals* imbricated. *Staminal tube* shortly toothed. *Ovary* 2-celled; ovules collateral.

11. **D. flavescens,** *Hiern;* leaflets 9–13 alternate elliptic acuminate glabrous midrib alone conspicuous, flowers subsessile crowded in elongated axillary spikes 4–5-merous minutely hairy, calyx very short nearly flat toothed, petals very slightly imbricated pale yellow, staminal tube glabrous below slightly pilose above, disk glabrous exceeding the 4-celled shortly hairy ovary.

MALACCA, *Maingay.*
Leaves 1–2 ft.; leaflets 3–5 by 1¼–2 in.; petiolules ⅕–¼ in. *Flowers* ⅓ in.; calyx minutely spongio-pilose (Maingay mss.); petals minutely pilose outside, glabrous inside; anthers black; style very minutely and sparingly pilose, stigma discoid, surrounded at the base by a ring. *Disk* dull reddish-orange, entire or undulated at the mouth. *Ovules* 2 together, superposed.

12. **D. Griffithii,** *Hiern;* leaflets alternate about 11 oblong-lanceolate acuminate glabrous shining, racemes from the axils of fallen leaves at the lower parts of the branches short, pedicels shorter than the 4-merous nearly glabrous flowers, calyx very short nearly flat, staminal tube puberulent outside glabrous inside, disk glabrous equalling or rather exceeding the 4 (3-)-celled somewhat hairy ovary, style puberulent. Hartighsea ramiflora, *Griff. Notul.* iv. 501.

MALACCA, *Griffith.*
Branchlets subsimple, elongated, flowering below, leafy above; youngest parts ferruginous-scaly. *Leaves* 1–1½ ft.; leaflets 4½–5 by 1½ in.; petiolules ⅛ in. *Flowers* pale-yellow, quickly turning brown; petals ⅓ in. by ⅒ in. *Racemes* 1 in. long.—In the axils of the lowest leaves a short raceme sometimes occurs.

†† Leaflets opposite or subopposite.

13. **D. cauliflorum,** *Hiern;* pallid, leaflets about 13 opposite or subopposite elliptic or oblong obtusely and shortly acuminate glabrous chartaceous, base cuneate, spikes clustered on the trunk much shorter than the leaves tawny-pubescent, flowers crowded 4-merous, calyx obscurely 4-toothed, petals puberulent, staminal tube rather pubescent on both sides 8-lobed, lobes notched at apex, anthers 8 included short, style shaggy below not exserted, disk tubular glabrous much exceeding the ovary much shorter than the hairy style obscurely and obtusely 4-toothed, ovary 4-celled hairy "cells 1-ovuled." (*Maingay.*)

MALACCA, *Maingay.*
A tree. *Leaves* 1–2 ft.; leaflets 4–8 by 1¼–3¼ in. *Shoots* tawny-velutinous; petiolules ⅙–½ in. or terminal one longer. *Inflorescence* 3–4 in. long; flowers ⅓–⅜ in. long. *Calyx* 1/12–⅒ in. long. *Fruit* 1 in. long, nearly glabrous, 1–2-seeded, subglobose, 4-valved, deep dull red.

14. **D. cuneatum,** *Hiern;* leaflets 13 opposite or subopposite elliptic obtuse or shortly acuminate glabrous, base cuneate, inflorescence spicate shorter than the leaves, flowers 4-merous subsessile, calyx campanulate obtusely cleft halfway down shortly pubescent, petals nearly glabrous slightly imbricated, staminal tube with 8 hairy lines outside pubescent inside, disk nearly equalling the ovary glabrous outside densely hairy inside, style pilose-pubescent below, ovary densely hairy 4-celled, fruit subglobose.

MALACCA, *Maingay;* (? Sincapore, *T. Anderson*).
A large tree. *Leaves* 2–2½ ft.; leaflets 4–7 by 2–3 in.; petiolules ¼–⅜ in., somewhat tumid at base. *Flowers* ⅜ in. long; calyx nearly half the length of the flower; style robust. *Fruit* 1 in. long, 3-valved.—Local name "Tautoolan." According to Dr. Maingay's ms. notes, the staminal tube is campanulate, cleft into 10 narrowly quadrate

divisions slightly crenulate at the margins; stamens 10; ovary 5-celled, each cell containing 1 subhorizontal ovule; seeds with an incomplete orange arillus.

7. **CHISOCHETON,** Blume. (*Schizochiton.*)

Trees or shrubs. *Leaves* pinnate, quite entire, opposite or subopposite; leaflets more or less oblique. *Panicles* supra-axillary divaricately branched many-flowered, rarely axillary or flowers in spicate racemes; flowers polygamo-diœcious. *Calyx* small, cup-shaped, 4–5-toothed. *Petals* 4–5, very rarely 6, usually linear-elongated, long cohering in a tube especially below, at length spreading, somewhat imbricated or valvate. *Staminal tube* elongated, slender, tubular, 4–8-lobed at the apex, lobes entire or toothed; anthers linear, equal in number to and alternate with the lobes, included or somewhat exserted. *Disk* short and fleshy or tubular. *Ovary* short, 2–4-celled; style filiform, usually exceeding the staminal tube, stigma capitate; ovules usually one in each cell. *Capsule* subglobose, thickly coriaceous, 2–4-celled, loculicidally 2–4-valved. *Seeds* usually enclosed in an imperfect aril, hile usually suborbicular or oval; cotyledons usually peltate.—DISTRIB. A genus of about 12 species confined to Eastern India and the Indian Archipelago.

SECT. I. *Racemes* spicate.

1. **C. spicatus,** *Hiern;* leaflets 4 or 6 opposite elliptic or oblong acuminate glabrescent, base cuneate shortly petiolulate, racemes spicate axillary, calyx entire, staminal tube obtusely 5–6-toothed, anthers 5–6.

MALACCA, *Maingay.*

A tree about 30 ft. high. *Young parts* and *inflorescence* pale tawny, puberulent. *Leaves* 8–12 in., terminating in a growing point; leaflets 2–6 by 1¼–2 in., but little oblique. *Spikes* 4–6 in., about double the length of the common peduncle; flowers subsessile, ½–⅔ in. long; bracteoles ovate, small. *Petals* 4. *Staminal tube* appressedly pubescent on both sides. *Fruit* (immature) attenuate at both ends, especially towards apex, obsoletely tomentose.

SECT. II. *Flowers* panicled.

* *Anthers* 5 *or fewer.*

2. **C. erythrocarpus,** *Hiern;* leaflets 10–12 opposite elliptic or oblong obtusely cuspidate glabrate above, base obtuse, panicles about half the length of the leaves many-flowered supra-axillary, anthers 5, disk inconspicuous, fruit globose base stipitate.

MALACCA, *Maingay.*

Young parts petioles petiolules and fruit tawny and shortly tomentose. *Leaves* terminating in growing points, about 1 ft. long or more; leaflets 3–6 by 1½–2 in.; petiolules ⅙–⅕ in. *Flowers* $\frac{5}{12}$ in. long; pedicels short. *Calyx* 3–5-toothed. *Petals* 5, valvate. *Staminal tube* truncately 5-toothed at apex, pubescent on both sides, teeth centrally emarginate, truncate; anthers 5, included. *Ovary* 2–?-celled; ovules solitary. *Fruit* bright blood-red. *Seeds* exarillate, 1 in. long; testa very thick, coriaceous, bright orange; hile ⅜–½ in. diam.

3. **C. penduliflorus,** *Planch. mss. in Hb. Kew.;* tawny velvety, leaflets 10–11 opposite elliptic or ovate or upper ones obovate cuspidate base rounded or subcordate except of the upper leaflets, panicles elongated supra-axillary very narrow pendulous, flowers 4–5-merous elongated, calyx toothed or entire, staminal tube appressedly pilose outside below its 3–5 lobes, sparingly pilose inside below the middle, lobes deeply emarginate, anthers 3–5 included sessile, style very slender glabrous above pilose below, disk glabrous free short cupular fleshy. Melia penduliflora, *Wall. Cat.* n. 1255.

MALACCA, *Maingay*; PENANG, *Porter*.

A small tree or shrub. *Leaves* 1–2 ft.; leaflets 3–9 by 1⅙–3 in.; petiolules very short. *Panicles* nearly as long as the leaves. *Flowers* ¾–⅞ in. long, clustered, subsessile, dull red. *Young fruit* fusiform-oblong, appressedly silky, 1 in. long.

** *Anthers* 6–8.

† Flowers subsessile or on very short pedicels.

‡ *Teeth of staminal tube lanceolate.*

4. **C. glomeratus,** *Hiern*; young parts inflorescence lower surface of leaflets and midrib above hispid-pubescent tawny, leaflets 2–5–7 opposite elliptic cuspidate base rounded very shortly petiolulate, panicles supra-axillary equalling the leaves, flowers subsessile clustered, calyx obscurely toothed, petals 4 nearly glabrous, staminal tube 6-toothed teeth lanceolate entire silky inside, anthers 6 somewhat exserted, style very hairy. Schizochiton? *Wall. Cat.* 9040.

PENANG hills, *Porter*.

A very lofty tree, and stout in proportion. *Leaves* 1–1½ ft., often terminating in a growing point; leaflets 4–8 by 1½–2½ in. *Flowers* ¼ in. long or more, glabrous, white.—A specimen in fruit from Malacca (Hb. Griffith, Kew distr. n. 1065), with a leaf 2 ft. long and leaflets 6–10 by 2½–3½ in., and fruit 1⅓ in. long, seems to belong to this species.

5. **C. fragrans,** *Hiern*; subglabrous, leaflets 16–28 subopposite elliptic-oblong obtusely acuminate nervose shortly petiolulate, base obtuse oblique, male panicles elongated about equalling the leaves, flowers 4-merous, calyx 4-toothed or subentire, teeth of staminal tube 6–5 entire, fruiting racemes elongated pendulous equalling or shorter than the leaves, fruits subglobose somewhat pyriform pedicelled 2-celled, cells 1–2-seeded.

MALACCA, *Griffith*, *Maingay* 324.

A lofty tree. *Leaves* 1½ ft., dark green; leaflets 1½–4 by ¾–1¼ in.; petiolules ⅛–⅙ in. *Flowering panicles* 1 ft. or more long, pendulous, supra-axillary; flowers ¼ in. long, very fragrant, shortly pedicelled. *Petals* slightly imbricated above, glabrous, reflexed to the middle. *Staminal tube* petaloid, glabrous outside, hairy inside; teeth lanceolate, acute, spreading. *Anthers* 6–5, sessile, exserted. *Ovary* 2?-celled; *style* appressedly hairy. *Disk* annular, fleshy. *Fruiting racemes* 1 ft. or more long. *Fruits* obsoletely tomentose, reddish brown, 1¼ in. diam., 2-celled; few, many being abortive, on short pedicels stouter than the peduncle. *Aril* large, fleshy, white, covering half the seed; hile broadly oval. *Cotyledons* greenish, very thick, fleshy, deeply auricled.

6. **C. holocalyx,** *Hiern*; subglabrous, leaflets 17–23 narrowly oblong narrowly acuminate opposite or subopposite petiolulate, base obliquely cuneate, margins narrowly revolute, panicles elongated narrow drooping supra-axillary, flowers 4-merous, calyx truncate entire, staminal tube pubescent especially inside 6–8-toothed teeth lanceolate acute entire or bifid, anthers 6–8 somewhat exserted sessile, style appressedly pubescent, disk annular fleshy about equalling the short ovary.

MALACCA, *Maingay*; SINCAPORE, *T. Anderson*.

Leaves 2–3 ft.; leaflets 3–7 by 1–1¾ in.; petiolules ⅙–¼ in. *Panicles* nearly equalling the leaves with very short divaricate branches; pedicels very short. *Flowers* ⅓ in. long. *Petals* glabrous except the apex. *Ovary* 2-celled.—"Flowers with a stercoraceous odour like Pæderia" (*Maingay*). Closely allied to C. divergens, *Blume*.

‡‡ *Teeth of staminal tube oblong.*

7. **C. dysoxylifolius,** *Kurz in Journ. As. Soc. Beng.* xl. ii. 49 (1871); leaflets alternate oblong or oblong-lanceolate acuminate glabrous subcor-

iaceous shortly and thickly petiolulate, base oblique rather obtuse, panicles supra-axillary pyramidal elongated more or less pubescent, flowers subsessile 4-merous, calyx obsoletely toothed very thinly pubescent, petals pubescent, staminal tube appressedly pubescent 6-lobed at the apex lobes oblong obtuse entire quite glabrous, anthers 6, ovary and style pubescent towards the base.

Martaban, at Thoungyeen, *Brandis.*

A tree, glabrous in most parts. *Leaves* large, " very like those of Dysoxylum acuminatissimum," *Kurz;* leaflets 6–12 by 3–4 in.; petiolules puberulent, ¼ in. *Panicles* 1½ ft. or more; bracteoles small, lanceolate, pubescent; flowers ½ in. long. *Style* equalling the staminal tube.

8. **C. grandiflorus,** *Kurz in Journ. As. Soc. Beng.* xli. ii. 296 (1872); leaflets 8–13 opposite or subopposite oblong or oblong-lanceolate shortly acuminate glabrescent above except the nerves softly pubescent beneath shortly and thickly petiolulate, panicles axillary slender densely tawny-tomentose, flowers subsessile clustered, calyx cup-shaped obsoletely 4-toothed, densely pubescent outside as well as the 4–6 petals, glabrous inside, staminal tube sparingly pubescent outside glabrous inside 6–7-lobed lobes oblong truncate entire, anthers 6–7 included, capsules 3-lobed pyriform 3-valved. Plagiotaxis grandiflora, *Wall. Cat.* 1271. Dysoxylum grandiflorum, *Roem. Synops.* i. 135; *W. & A. Prodr.* i. 123. Diplotaxis grandiflora, *Wall. ex Kurz Rep. Veg. Andam. ed.* ii. 33. Epicharis sp. *Kurz* l.c. *ed.* i. p. iv.

Tenasserim, *Gomez;* S. Andaman, *Kurz.*

A moderately-sized or large tree with young parts tawny velvety-tomentose or pubescent. *Leaflets* 6–10 in. *Flowers* ½–⅔ in. long, silky-tomentose, subtended by a widely oblong densely tawny-pubescent calyx ¼ in. long. *Panicles* on long peduncles. *Ovary* and *style* tawny-pubescent. *Disk* cup-shaped, as high as the ovary, glabrous. *Capsule* 1¼ in. long; seeds solitary; aril complete, orange.

†† Flowers on slender pedicels.

9. **C. paniculatus,** *Hiern;* young parts and inflorescence hispid-pubescent, leaflets 7–24 opposite or subopposite elliptic ovate-oblong or oblong acuminate glabrescent or hispid-pubescent on the veins beneath papery-coriaceous, base obtuse oblique shortly petiolulate, panicles usually about equalling or exceeding the leaves with elongated lax branches, flowers pubescent or glabrate on slender pedicels, calyx obscurely 4-toothed staminal tube more or less pubescent on both sides obtusely 6–8-lobed lobes deeply bifid, style pubescent below. Guarea paniculata, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 242, *not of Wall.* Dysoxylum multijugum, *Arn. ex W. & A. Prodr.* i. 121. D. paniculatum, *Arn. ex Wight Ic.* n. 146. Trichilia? longissima, *Wall. Cat.* n. 8069. Cupania (sp.) *Wall. Cat.* 8069.—*Wall. Cat.* p. 250, n. 4884 B *not* A.

Eastern Bengal, Assam, Cachar, the Khasia Mts., and Tavoy.

Leaves 15–36 in. or more; leaflets 4–10 by 1½–4 in.; petiolules ⅙–¼ in. *Panicles* axillary, 2–3 ft. long, ramifications hairy; pedicels ⅒–⅙ in. long; flowers ½–¾ in. long, 4-merous, pale yellow; rachis often angular. *Ovary* 4-celled, cells 1-rarely 2-ovuled. *Capsule* 1–2½ in. diam., globose, base pyriform, 2–4-celled, smooth, of a dark orange or red colour when ripe.—The anthers in Wight's figure are ovate instead of linear. *Sapindus multijugus,* Wall. Cat. 8099, leaves only, from Taong Dong, Burma, may possibly belong to this species.

C.? costatus, *Hiern;* leaflets about 10 alternate ovate-oblong acutely acuminate pale olive and velvety beneath, base rounded or slightly excavated, panicles short supra-axillary, fruit subglabrous subglobose or ellipsoidal 3–2-ribbed.

Eastern Bengal; in Cachar, *R. L. Keenan.*

A tree with the shoots softly and shortly velvety. *Leaves* about 18 in.; leaflets 3–8 by 1½–2¼ in., dark green, subglabrous above, lateral veins 15–24 on each side of midrib; petiolules ⅙–⅕ in. *Fruiting panicles* 3 in. long; fruit orange-coloured, 1–1½ in. long, base shortly stipitate. *Seeds* nearly 1 in. long, hile ½ in. diam. near the apex; cotyledons somewhat peltate.

8. **SANDORICUM,** Cav.

Trees. *Leaves* trifoliolate, coriaceous; leaflets quite entire, the lateral ones shortly and the terminal one long-petiolulate. *Flowers* 5-merous, in axillary panicles, yellow or whitish. *Calyx* cup-shaped, with short lobes imbricated in bud; base of the tube adnate to the ovary. *Petals* imbricated, spreading. *Staminal tube* tubular, nearly as long as the petals, toothed at the apex; anthers 10 or 8, included. *Disk* cup-shaped, sheathing the ovary and base of the style, laciniate. *Ovary* 5-celled, adnate to the calyx below, attenuate into the style above, cells opposite the calyx-lobes, each with 2 collateral pendulous ovules; style cylindrical or columnar, nearly the length of the staminal tube, crowned by a slightly elevated glandular ring, stigmas 5 short linear subacute or truncate. *Berry* superior, globular, fleshy, indehiscent, 3–5-celled and -seeded; flesh edible. *Seeds* included in a papery aril, pulpy outside.—Distrib. A genus of about 4 species limited to India and the Malayan Archipelago, one species being cultivated over an extensive area.

1. **S. indicum,** *Cav. Diss.* (vii.) p. 359, tt. 202, 203; shoots panicles and lower surface of leaves at least on the veins tawny-velvety, leaflets elliptic or ovate-orbicular shortly acuminate or apiculate, base unequally obtuse, flowers clustered subsessile in ample much branched panicles small yellowish sweet-scented, calyx shortly pubescent. *W. & A. Prodr.* i. 120: *Bedd. Anal. Gen.* lv.; *Adr. Juss. in Mém. Mus.* xix. t. 16, f. 15; *Drury Fl. Ind.* i. 165; *Hassk. Retzia,* i. 146; *Roxb. Cor. Pl.* iii. t. 261; *Fl. Ind.* ii. 392; *Wall. Cat.* 1249. S. nervosum, *Blume Bijd.* 163. S. ternatum, *Blanco Fl. Filip. ed.* i. 346. S. glaberrimum, *Hassk. Retzia,* i. 145. Trichilia nervosa, *Vahl Symb.* i. 31. Melia Koetjape, *Burm. Fl. Ind.* 101. T. venosa, *Spreng. Syst.* iii. 68.

Eastern Peninsula; from Rangoon and Tenasserim (var. β *velutina*) to Penang. Introduced in the Western Peninsula.—Distrib. Malayan Islands.

A lofty tree. *Leaves* 6–18 in.; leaflets 3–8 by 1½–4⅔ in.; common petiole 1¾–6 in. *Flowers* ⅙ in. long; calyx about 1/12 in. *Stigmas* truncate. *Fruit* about 3 in. diam.; pulp fleshy, acid, with a peculiar smell.—The Burmese eat the raw fruit. There are two varieties known at Sincapore, according to Captain Blomfield, under the distinctive names of "Santól" and "Kachápee;" they differ in the fruit like the apple and pear in appearance and flavour.—S. serratum, *G. Don Gen. Syst.* i. 680, differing by its repand-crenate leaflets, may belong to this species.

2. **S. emarginatum,** *Hiern;* glabrous, leaflets obovate or elliptic emarginate usually mucronulate rigid, base obtusely narrowed oblique, lateral veins feeble, panicles short dense, pedicels shorter than the flowers, fruit obovoid very shortly tomentose.

Malacca, *Maingay.*

Leaves 5–7 in.; leaflets 2–3½ by 1¼–2 in.; petiolules ⅓–to ½ in., the terminal one quasi-articulated near apex, 1–1¼ in. *Calyx* somewhat enlarged and persistent in fruit.

Staminal tube terminating in 8 or 10 subglabrate emarginate lobes. *Flowers* $\frac{1}{8}$ in. long. *Fruit* (immature?) $\frac{5}{8}$ in. long.

3. **S. Maingayi,** *Hiern;* subglabrous, leaves elliptic subacuminate, base obtuse, lateral nerves strong above depressed beneath, panicles shorter than the leaves, pedicels equalling the flowers mostly exceeding the subulate bracteoles, calyx fleshy obscurely toothed very minutely pilose.

MALACCA, *Maingay.*

A tree. *Leaves* about 6–8 in.; leaflets 2–5 by $1\frac{1}{2}$–3 in.; petiolules $\frac{1}{4}$ in.; terminal one quasi-articulated near apex, $1\frac{1}{4}$–$1\frac{3}{4}$ in. *Flowers* $\frac{1}{3}$–$\frac{3}{8}$ in. long. *Calyx* $\frac{1}{8}$–$\frac{1}{7}$ in. long. *Petals* white tinged with pink, glabrous, marked outside with pale glandular dots. *Staminal tube* ventricose-cylindrical, contracted at the throat, ribbed externally and 5-lobed near the apex, each lobe obtusely 4-toothed, the 2 central teeth larger. *Anthers* 2-seriate. *Stigma* subacute.—Cfr. *S. borneense,* Miq. Ann. Mus. Bot. Lugd.-Bat. iv. 33.

9. AGLAIA, Lour.

Trees or shrubs, glabrous lepidote or stellately pubescent. *Leaves* pinnate or trifoliolate; leaflets quite entire. *Flowers* polygamo-diœcious, minute or small, numerous, paniculate, subglobose. *Calyx* 5-lobed, imbricated in bud. *Petals* 5, concave, short, imbricated. *Staminal tube* urceolate or subglobose, 5-toothed at the apex or entire; anthers 5, included or half-exserted, erect. *Disk* inconspicuous. *Ovary* ovoid or shortly so, 1–3-celled, with 2–1 ovules in each cell; style very short. *Berry* dry, 1–2-celled and -seeded. *Seeds* with a fleshy integument.—DISTRIB. Species about 50, inhabiting China, the Malay islands and the islands of the Pacific ocean, as well as India.

Milnea? racemosa, Roemer Synops. i. 98 (*Nyalelia racemosa,* Dennstedt Schlüss. Hort. Mal. 23. *Nyalel,* Reede Hort. Mal. iv. t. 16), has, according to the figure, the structure of the stamens incompatible with the Order Meliaceæ.

SECT. I. *Shoots leaves* and *inflorescence* lepidote or glabrous.

* *Leaflets* 3–5, *rarely* 7.

† Inflorescence lax, pedicels slender, about equalling the flowers.

1. **A. odorata,** *Lour. Fl. Cochinch.* 173; glabrous or quickly becoming so, leaflets obovate or oblong obtuse shortly petiolulate terminal one longest, base cuneate, panicles rather lax, flowers on slender pedicels about as long as themselves, ovary hairy. *Wight Ic.* t. 511; *Miq. Ann. Mus. Lugd.-Bat.* iv. 48; *Wall. Cat.* 1275; *Adr. Juss. in Mém. Mus.* xix. t. 14, f. 7. Camunium sinense, *Rumph. Amb.* v. 28, t. 18, f. 1. C. chinense, *Roxb. Hort. Beng.* 18; *Fl. Ind.* i. 636. Opilia odorata, *Spr. Syst. Veg.* i. 766. Murraya exotica, *Reinw. ex Miq.* l.c. A. pentaphylla, *Kurz ex Miq.* l.c.

EASTERN PENINSULA; Malacca, Penang, and Sincapore; (CEYLON, cultiv.).—DISTRIB. Siam, Java, China.

An elegant shrub or small leafy tree; extremities of young shoots covered with stellate ferruginous scales. *Leaves* 2–6 in.; leaflets 1–3 by $\frac{1}{3}$–$1\frac{1}{2}$ in. *Flowers* yellow, fragrant, $\frac{1}{12}$ in. diam.—Often cultivated for its sweet-scented flowers.

†† Inflorescence dense; pedicels very short.

2. **A. khasiana,** *Hiern;* leaves narrowly elliptical obtusely narrowed towards both ends glabrescent on rather long petiolules, panicles short ferruginous, branches short patent, flowers subsessile not minute.

KHASIA MTS.; alt. 4–5000 ft., *J. D. H. & T. T.;* (? Sikkim, Himalaya, *J. D. H.*).

Shoots and inflorescence lepidote. *Leaves* 6–12 in.; leaflets 4–8 by 1–2 in.; petiolules $\frac{1}{3}$–1 in. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in. diam. *Fruit?* glabrous, 1 in. diam.

3. **A.? andamanica**, *Hiern;* leaflets 3–5 alternate or subopposite ovate-elliptical obtusely acuminate rounded or obtuse at the base sparsely lepidote, inflorescence shorter than the leaves, pedicels very short, fruit pale tawny lepidote somewhat pear-shaped. Milnea (sp.), *Kurz Andam. Rep.* p. iv.; Ed. 2, 33.

South Andaman Islands; in the Jungles between Port Mouat and Homfray's Ghât, not rare. Burmese name, Tau-ahnyeen, *Kurz.*

A tree, 30–40 ft. high; indumentum pallid. *Leaves* 10 in.; leaflets $3\frac{1}{2}$–5 by 2 in.; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Fruit* $\frac{1}{2}$–$\frac{2}{3}$ in. by $\frac{1}{3}$–$\frac{3}{8}$ in.

4. **A. apiocarpa,** *Hiern;* leaflets 5–7 rather narrowly and unequally elliptic obtusely acuminate base cuneate, younger ones lepidote below glabrescent, inflorescence shorter than the leaves with short spreading branches and shortly pedicellate small flowers, fruit pyriform reddish-brown lepidote. Milnea apiocarpa, *Thw. Enum.* 60.

Ceylon; in the central provinces, alt. 3–6000 ft.

A small tree. *Leaves* 6–16 in.; leaflets 2–8 by $\frac{3}{4}$–3 in.; petiolules $\frac{1}{6}$–$\frac{3}{4}$ in.; indumentum reddish-brown. *Flowers* $\frac{1}{10}$ in. diam., about equalling the pedicels. *Fruit* $\frac{3}{4}$–$\frac{7}{8}$ by $\frac{3}{8}$–$\frac{1}{2}$ in.

5. **A. Roxburghiana,** *Miq. Ann. Mus. Lugd.-Bat.* iv. 41; leaflets 5 rarely 7 or 3 more or less elliptic obtuse glabrescent sometimes acuminate base usually cuneate shortly petiolulate, panicles rather supra-axillary pyramidal elongate, flowers shortly pedicellate, fruit subglobose ferruginous-lepidote. *Beddome Flor. Sylvat.* t. 130 (*excl. synon. Thw.*); *Anal. Gen.* lv. Milnea Roxburghiana, *W. & A. Prodr.* i. 119; *Drury Ind. Fl.* i. 164; *Wight Ic.* t. 166 (M. Roxburghii). A. lepidota, *Miq. Fl. Ind.-Bat. Suppl.* 197, 507. A. Spanoghei, *Bl. ex Miq. Ann.* l.c. Aglaia (spe. Sangian), *Teysm. et Binnend. Cat. Hort. Bogor.* 211. Walsura? lanceolata, *Wall. Cat.* 4886. A. grata, *Wall. ex Voigt Hort. Sub. Calc.* 136. A. midnaporensis, *Carey ex Voigt.* l.c. *Cfr.* Aglaia? sp., *Wall. Cat.* n. 9039; Meliacea singapureana, *Wall. Cat.* 4887. Dimocarpus, *Wall. Cat.* 8050.

Western Peninsula; from the Concan and Midnapore southwards; Ceylon, ascending to 6000 ft.; Singapore, *Wallich;* (? Tenasserim and the Andaman Islds., *Helfer;* Burma, *Wallich,* and Malacca, *Griffith* & *Maingay*).—Distrib. Java, Sumatra, and other Malay Islands.

A large tree; indumentum ferruginous. *Leaves* 3–7 in.; leaflets $1\frac{1}{2}$–$4\frac{1}{2}$ by $\frac{2}{3}$–2 in.; petiolules $\frac{1}{10}$–$\frac{1}{2}$ in. *Flowers* $\frac{1}{12}$ in. diam.; calyx dull yellow, often covered with stellate hairs; petals yellow. *Fruit* $\frac{3}{4}$ in. diam., edible, buff-coloured, very minutely pilose. *Radicle* minutely pilose.

** *Leaflets* 7–9.

6. **A. glabriflora,** *Hiern;* shining, leaflets 7–9 subopposite or alternate elliptic acuminate base cuneate shortly petiolulate, panicles ample rather lax shorter than or about equalling the leaves, pedicels about equalling the glabrous flowers, staminal tube turbinate.

Malacca; on Mt. Ophir, *Griffith, Maingay.*

Whole plant nearly glabrous. *Leaves* 6 in.; leaflets 2 by 1 in.; petiolules $\frac{1}{8}$–$\frac{1}{6}$ in. *Pedicels* slender, $\frac{1}{12}$–$\frac{1}{8}$ in. *Flowers* $\frac{1}{10}$ in. long or less. *Fruit* size of cherries, white, subglobose.

7. **A. Wallichii,** *Hiern;* young parts sparsely lepidote, leaflets 7–9 opposite or subopposite narrowly elliptic or lanceolate-oblong acuminate

base obtuse margins slightly undulated, petiolules short much branched, panicles rather supra-axillary shorter than or about equalling the leaves, pedicels rather slender about equalling the flowers, calyx lepidote shortly ciliate, corolla glabrous, staminal tube urceolate. Sapindus lepidotus, *Wall. Cat.* 8036.

SILHET, *Wallich, Griffith.*

Leaves 5–8 in.; leaflets $1\frac{1}{2}$–4 by $\frac{1}{2}$–$1\frac{1}{2}$ in.; petiolules $\frac{1}{8}$–$\frac{1}{4}$ in. *Inflorescence* 3–5 in. long; flowers $\frac{1}{15}$ in. diam.

*** *Leaflets* 9–13 *or more.*

8. **A. perviridis,** *Hiern;* leaflets 11–13 opposite oblong acuminate glabrous shining base obtuse shortly petiolulate, panicles pyramidal elongated many-flowered lepidote, flowers very small, staminal tube subglobose.

KHASIA MTS., *Griffith, J. D. H. & T. T.*, alt. 2000 ft. (*Milnea,* No. 8).

A tree of 40 ft.; leaves and buds deep green. *Leaves* about 1 ft.; leaflets 2–5 by $\frac{3}{4}$–$1\frac{1}{2}$ in.; petiolule $\frac{1}{5}$–$\frac{1}{4}$ in. *Panicles* nearly as long as the leaves; flower-buds minute, nearly glabrous.—Specimens from Sikkim, collected by Dr. Hooker, probably belong to this species; they have leaves 1–$1\frac{2}{3}$ ft., leaflets 3–8 by 1–$2\frac{1}{4}$ in., fruiting panicles 4–9 in. long, fruits ellipsoidal about 1 in. long, seeds nearly as long.

9. **A. crassinervia,** *Kurz in litt. ad Hook. f.;* leaflets 9 or more, opposite or subopposite oblong obtuse at both ends with minute scales beneath shortly petiolulate, petioles angular, panicles supra-axillary pyramidal elongated many-flowered lepidote-ferruginous, flowers minute.

TENASSERIM, *Helfer.*

Leaves 18 in. or more; leaflets 6–10 by 2–$2\frac{3}{4}$ in.; lateral veins about 20 on each side of midrib with which they make a large angle; petiolule $\frac{1}{6}$ in., terminal one $\frac{1}{2}$–$\frac{3}{4}$ in. *Panicles* 10–15 in. or more long.

SECT. II. *Shoots leaves* and *inflorescence* stellate-pubescent or tomentose.

* *Flowers shortly pedicelled.*

10. **A. edulis,** *A. Gray in Bot. U. S. Explor. Exped.* i. 237; leaflets 9–13 opposite or subopposite elliptic or oblong obtuse or acuminate shortly petiolulate subglabrescent or scattered beneath as well as the shoots inflorescence and fruit with ferruginous scales mixed sometimes with stellate hairs, panicles pyramidal shorter than the leaves, flowers shortly pedicellate, fruit subglobose edible. *Miq. Ann. Mus. Lugd.-Bat.* iv. 49. Milnea edulis, *Roxb. Hort. Beng.* 18; *Fl. Ind.* i. 637; *Drury Ind. Fl.* i. 164; *Wall. Cat.* 1279. Camunium bengalense, *Hb. Ham. ex Wall.* l.c. *Cfr.* Cupania (sp.) *Wall. Cat.* 8067, *letter* B *not* A.

EASTERN BENGAL; Silhet, *Wallich, J. D. H. & T. T.* (*Milnea,* sp. 17); (? Assam *Simon*).—DISTRIB. Borneo, Fiji Islds.

A tree of middling size. *Leaves* $\frac{3}{4}$–2 ft.; leaflets 2–9 by 1–3 in.; petiolule $\frac{1}{8}$–$\frac{1}{3}$ in. *Flowers* small. *Fruit* more than 1 in. diam. according to Roxburgh; succulent integument of the seed eaten.—A. sexipetala, *Griff. Notul.* iv. 505, sometimes with 6 petals and with rather fleshy leaflets, appears to belong to this species. The authentic specimen in Herb. Kew. has leaves with 8–9 leaflets, not trifoliolate as given in Griffith's description.

11. **A. tenuicaulis,** *Hiern;* indumentum rufous-stellate, leaflets 9 or more alternate shortly acuminate rounded or somewhat cuneate and sometimes minutely peltate at the base shortly petiolulate, flowers small

shortly pedicellate arranged in ample many-flowered pyramidal panicles shorter than the leaves, fruits in short panicles ellipsoidal.

Penang? top of the hill, *Maingay*. (? Sincapore, *Lobb.*)

A tree of 8 ft. with slender stem. *Leaves* 3 ft. or more; leaflets glaucescent above, 6–11 by 3–4 in.; petiolule ⅛–¼ in. *Inflorescence* 6–12 in. long. *Fruit* ½ in. long.

Specimens from Sincapore, collected by Lobb, with ovate-oblong leaves and short dense young panicles, probably belongs to this species.—Maingay's specimens are marked as "from top of hill" simply, Penang being probably intended.

12. **A. minutiflora,** *Bedd. Ic. Pl. Ind. Or.* i. 44, t. 193; pubescence ferruginous- or rufous-stellate, leaflets 7–15 opposite or subopposite narrowly elliptic or oblong-lanceolate acuminate, base subcordate rounded or subcuneate, panicles divaricately branched many-flowered, flowers shortly pedicelled, fruit subglobose 1–2-seeded. A. polyantha, *Bedd.* l.c. Euphora exstipulatis, *Griff. Notul.* iv. 547.

A bandsome slender tree of 25 or 40 ft. with hard wood. *Leaves* 6–24 in. or more; leaflets 2–7 by ⅔–2¼ in., stellate-hairy beneath, glabrescent above except midrib. *Panicles* half to all the length of the leaves. *Fruit* ⅔–1 by ½–⅞ in.

There are two forms, possibly distinct species.

a. travancorica; leaflets usually subcordate, flowers ⅒ in. thick, corolla subglabrescent.—Courtallum, *Wight;* Travancor, Western Ghats, alt. 2–3500 ft., *Beddome.*

β. Griffithii; leaflets subcuneate or rounded at the base sometimes with pellucid dots, flowers minute, "cotyledons amygdaloid superposed, radicle imbedded between the cotyledons its apex perpendicular to the ventral face of the seed its opposite pole delicately pilose" (*Maingay mss.*).—Tenasserim and Malacca, *Griffith, Maingay.*

** *Flowers clustered in small spikes.*

13. **A. cordata,** *Hiern;* pubescence rufous-stellate, leaflets subsessile 7 elliptic opposite finely acuminate, base more or less cordate, flowers small sessile in little spike-like clusters arranged on a pyramidal panicle nearly equalling or shorter than the leaves.

Malacca, *Maingay.*

Leaves 12–18 in.; leaflets 4–8 by 2–3½ in. *Panicles* 5–10 in. long or more.

Form 1. *Calyx* glabrous.

Form 2. *Calyx* hirsute.

14. **A. palembanica,** *Miq. Fl. Ind. Bat. Suppl.* i. 507; *Ann. Mus. Lugd.-Bat.* iv. 52; pubescence rufous-stellate, leaflets 11–13 opposite or subopposite elliptic acuminate somewhat cuneate at the base shortly petiolulate, flowers small sessile in little spike-like clusters arranged on a pyramidal panicle rather shorter than the leaves, fruit depresso-globose. A. Sippannas, *Miq.* l.c. 506. A. tomentosa, *Teysm. & Binn. in Nat. Tijdschr. Ned. Ind.* xxvii. 43.

Malacca, *Griffith, Maingay.*—Distrib. Sumatra and S. Borneo.

Leaves 6–12 in.; leaflets 2–4 by ¾–1½ in., minutely pellucid-punctate (*Maingay*); petiolule ⅙–¼ in. *Panicles* 4½–9 in. long.

10. **LANSIUM,** Rumph.

Trees, glabrous or pubescent. *Leaves* odd-pinnate with quite entire alternate or opposite shortly petiolulate leaflets. *Flowers* polygamodiœcious, 5-merous, axillary, male usually paniculate, the female spicate-racemose. *Sepals* rounded, imbricated. *Petals* rounded, connivent, imbricated. *Staminal tube* globose, crenulated; anthers 10, obtuse, usually in two rows, the shorter ones included, the longer partly exserted sometimes apiculate. *Disk* obsolete. *Ovary* globose, 3–5-celled; cells 1–2-ovuled; style very short, thick, stigma truncate 3–5-lobed. *Fruit* baccate, edible, 1–5-celled; cells 1–2-seeded. *Seeds* oblong, with ventral hile, invested in a pulpy aril, exalbuminous.—DISTRIB. A genus of scarcely more than the following 4 species, confined to India and the Malay Archipelago.

The juicy envelope of the seeds is the part eaten, and the taste is cooling and pleasant.

* *Leaflets* 3–5.

1. **L. anamalayanum,** *Beddome in Trans. Linn. Soc.* xxv. 212; *Ic. Pl. Ind. Or.* 104; *Fl. Sylvat.* t. 131; leaflets alternate elliptic obtusely acuminate base cuneate glabrous except occasionally hairy glands in axils of veins beneath, sepals shortly ciliate, ovary strigose 3-lobed and -celled, cells 2-ovuled, fruit oblong, radicle pubescent.

WESTERN PENINSULA; common in the moist woods on the Anamallay hills, and in the Wynaad, alt. about 2000 ft., *Beddome.*

A good-sized tree. *Leaves* 6–9 in.; leaflets $3–4\frac{1}{2}$ by $1\frac{1}{2}–2$ in.; petiolule $\frac{1}{8}–\frac{3}{8}$ in. *Hermaphrodite flowers* sessile, about $\frac{1}{8}$ in. diam. *Fruit* as big as a large grape.

2. **L. pedicellatum,** *Hiern;* leaflets 3–5 alternate or subopposite elliptic acuminate glabrous base oblique obtuse or cuneate, ♀ racemes short simple or branched at the base, flowers pedicelled, ovary shortly tomentose 4-celled.

MALACCA, *Maingay.*

Shoots pale brown, obsoletely lepidote. *Leaves* 9–12 in.; leaflets 3–6 by $1\frac{1}{2}–3$ in. petiolule $\frac{1}{6}–\frac{1}{4}$ in. long. ♀ *Inflorescence* 1–2 in. long; pedicels $\frac{1}{8}–\frac{1}{6}$ in. long. *Young fruit* subglobose, fleshy, shortly tomentose, $\frac{1}{2}$ in. diam.

3. **L. cinereum,** *Hiern;* leaflets 3–5 opposite elliptic obtusely acuminate base cuneate coriaceous glabrous shining except the veins, sepals short, ovary hairy 5-celled, cells 1-ovuled.

MALACCA, *Maingay.*

Branches cinereous, tawny-pubescent at the extremities. *Leaves* 3–5 in.; leaflets pallid, $2–3\frac{1}{2}$ by $\frac{4}{5}–1\frac{1}{2}$ in.; petiolule $\frac{1}{8}–\frac{3}{8}$ in. *Hermaphrodite spikes* nearly equalling the leaves. *Longer anthers* apiculate.

** *Leaflets* 6–8.

4. **L. domesticum,** *Jack in Trans. Linn. Soc.* xiv. 115, t. iv. f. 1, *var.;* leaflets alternate elliptic oblong or obovate abruptly shortly and obtusely acuminate more or less narrowed at the base reticulate coriaceous shining nearly or quite glabrous, petiolules tumid at the base, hermaphrodite spikes springing from the trunk and naked branches solitary or fasciculate pubescent shorter than the leaves, ovary tomentose 5-celled, cells 1–2-ovuled. *Corréa de Serra in Ann. Mus.* x. 157, t. 7, f. 1.

MALACCA, *Griffith* (*Maingay*, cult.).—DISTRIB. Widely cultivated in India, and perhaps spontaneous in the Malay Archipelago. Philippine Islands, according to Blanco.

A tree. *Leaves* 9–18 in. long; leaflets 4–8 by 2–4 in.; petiolules $\frac{1}{4}–\frac{1}{2}$ in. *Flowers* sessile or subsessile. *Fruit* $1–1\frac{1}{2}$ in. long, yellowish, turbinate-ellipsoidal.—According to Griffith the spikes are proliferous at the apex.

L. javanicum, *Roemer Synops. Monogr.* i. 99; Aglaia Dookkoo, *Griff. Notul.* iv. 505; L. aqueum, *Miq. in Ann. Mus. Lugd.-Bat.* iv. 34; *and* L. humile, *Hassk. Retz. ed.*

nov. i. 121, are probably also varieties of this cultivated species. L. silvestre, *Roemer*, l.c. according to Miquel, l.c. scarcely belongs to Meliaceæ; the plant intended by this name has been referred by De Candolle to Cookia punctata, *Retz.*

11. **AMOORA,** Roxb.

Trees. *Leaves* usually unequally-pinnate; leaflets oblique quite entire axillary subdiœcious, paniculate; female spicate or racemose. *Calyx* 3–5-partite or -fid. *Petals* 3–5, thick, concave, imbricated, rarely slightly combined at the base. *Staminal tube* subglobose or campanulate, inconspicuously 6–10-crenate; anthers 6–10, included. *Disk* obsolete. *Ovary* sessile, short, 3–5-celled; cells 1–2-ovuled; stigma sessile, or style elongated in *A. Championii*. *Capsule* subglobose, coriaceous, 3–4-celled and -seeded, loculicidally 3–5-valved. *Seeds* in a fleshy aril, with ventral hile.—Distrib. A genus of about 15 species occurring only in India and the Malay Archipelago, and also 1 endemic species in Australia.

Sect. I. *Style* short; *staminal tube* subglobose or turbinate.

* *Panicles spicate, male branched, female simple or branched; flowers subsessile. Staminal tube 6-toothed; anthers* 6.

1. **A. Rohituka,** *W. & A. Prodr.* i. 119; young parts tawny closely pubescent in most cases quickly glabrescent leafy, leaflets 9–15 more or less elliptic or ovate acuminate opposite base usually obtuse shortly petiolulate, flowers white bracteate subsessile, male spikes panicled, female simple, calyx 5-partite, petals 3, anthers 6, ovary 3-celled with 2 superposed ovules in each cell. *Bedd. Fl. Sylvat.* t. 132 (but pedicels ⅙–¼ in. long); *Brandis For. Fl.* 69. Andersonia Rohituka, *Roxb. Hort. Beng.* 87; *Fl. Ind.* ii. 213; *Roxb. Drawings in Hb. Kew.* tt. 934, 1827. Sphærosacme polystachya, *Wall. Cat.* 1277. Aglaia ? polystachya, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 429. S. spicata, *Wall. Cat.* 4895. Buchanania spicata *Hb. Roxb. ex Wall.* l.c. Meliacea Wightiana, *Wall. Cat.* 4888. Amoora macrophylla, *Nimmo in Grah. Cat. Bomb. Pl.* 31. Andersonia Rohitoca, *Griff. Notul.* iv. 507; *Ic. Pl. Asiat.* iv. t. 589, f. 3.

Assam, Silhet, Cachar, Oudh, Western Peninsula from Concan to Travancore, Tenasserim and the Andaman Islands, Malacca, Ceylon.—Distrib. Malay Archipelago, Philippine Islds.

An evergreen tree with a large crown of branches. *Leaves* 1–3 ft.; leaflets 3–9 by 1⅓–4 in. *Male panicles* equalling or shorter than the leaves, female about half the length of the leaves; male flowers ⅓, female ¼ in. long. *Stigma* trigonous, angles opposite the calyx-lobes. *Fruit* smooth, pale yellow or reddish, 1–1½ in. diam., scarcely attenuate at the base, rather soft and fleshy, 3-celled, 3-valved.—The seeds supply an economic oil.—Col. Beddome, in his Flora Sylvatica, t. 132, figures and describes under this name a form from the Anamallay hills with shortly pedicelled flowers, the pedicels measuring ⅙–¼ in. long. A plant gathered by Dr. Hooker in the Sikkim Terai and Kursiong with very large leaves, the leaflets measuring 12–15 by 3–6 in., may belong to this species.

** *Flowers panicled, not spicate.*

† Petals 3. Anthers 6–10.

‡ *Leaflets* 3–6, *alternate or subalternate.*

2. **A. chittagonga,** *Hiern*: young parts calyx and fruit lepidote, leaflets 3–6 alternate and subalternate narrowly elliptic acuminate sub-

glabrescent, base more or less narrowed, panicles racemose rather lax much shorter than the leaves, calyx cup-shaped 3-toothed, petals 3, anthers 6, ovary 2-celled, fruit obovoid. Aglaia chittagonga, *Miq. in Ann. Mus. Lugd.-Bat.* iv. 44.—Meliacea, *Griff. Itin. Notes* 168.

Bhotan and Upper Assam, *Griffith;* the Khasia Mts., Chittagong, *J. D. H. & T. T.* (*Milnea, No.* 13); Pegu, *Kurz.*

A tree. *Leaves* 6-12 in.; leaflets 3–8 by 1–3 in.; petiolule ⅙–½ in. *Flowers* 1/10–⅛ in. long, pedicelled. *Fruit* (immature?) ⅔ in. long, longitudinally ridged, 2-celled.

3. **A. canarana,** *Benth. & Hook. f. Gen. Pl.* i. 335; young parts inflorescence calyx and fruit lepidote, leaflets 4–6 alternate or subalternate narrowly elliptic acuminate glabrate above usually punctate-lepidote beneath, base more or less narrowed shortly petiolulate, panicles pyramidal much branched shorter than the leaves, flowers shortly pedicelled, calyx 4–5-toothed cup-shaped ebracteate, corolla 3- (–4) -partite, staminal tube truncate, anthers 6 (–7) included or slightly exserted, ovary 3-celled, cells 2-ovuled, fruit obovoid. Oraoma canarana, *Turcz. in Bull. Soc. Nat. Mosc.* 1858, i. 411.

Western Peninsula, from Canara, *Stocks,* to the Anamallay hills, *Beddome.*

Leaves 6–14 in.; leaflets 3–6 by 1⅓–2½ in.; petiolule ⅙–⅖ in. *Fruit* (immature?) ⅔ in. long.

‡ *Leaflets* 3–13 *opposite or subopposite.*

4. **A. cucullata,** *Roxb. Cor. Pl.* iii. 54, t. 258; subglabrous, leaflets 3–13 opposite or subopposite obliquely ovate-oblong obtuse at both ends glabrous shining firm terminal one often hooded at the apex, male panicles drooping about as long as the leaves with numerous diverging branches sparingly lepidote, female racemes few-flowered, calyx 3-lobed, petals 3, anthers 6 (–8), ovary 3-celled, cells 2-ovuled, fruit subglobose 3-lobed 3-celled 3-valved. *Dalz. & Gibs. Bomb. Fl.* 37; *Drury Ind. Fl.* i. 164. Andersonia cucullata, *Roxb. Hort. Beng.* 87; *Fl. Ind.* ii. 212. Sphærosacme Rohituka, *Wall. Cat.* 1278, *excl. syn.* S.? laxa, *Wall. Cat.* 4894. S. paniculata, *Wall. Herb. ex Miq. Ann. Mus. Lugd.-Bat.* iv. 37. ? Amoora auriculata, *Miq. fide Miq.* l.c.

Lower Bengal, in the Sunderbunds, and in Nipal, *Wallich;* King's Island in the Andamans, *Helfer.*

A tree of considerable size and slow growth with cinereous bark and smooth branches. *Leaves* 6–16 in.; leaflets 3–7½ by 1⅓–2½ in.; petiolule ⅛–⅜ in. or terminal one longer. Male fl. ⅛ in. yellow. *Bracts* caducous, 2 at the base of the calyx. *Staminal tube* turbinate or subglobose. *Capsule* 2½ in. diam. *Seeds* three-quarters covered with a fleshy bright orange-coloured aril.

5. **A. lanceolata,** *Hiern;* subglabrous, leaflets about 17 opposite or subopposite approximated lanceolate obtusely acuminate glabrous shining, base obtuse lateral veins inconspicuous, male panicles nearly equalling the leaves, flowers 3-merous shortly pedicelled, calyx trifid, anthers 6 just included, ovary in the male flowers rudimentary.

Malacca, *Maingay.*

Shoots angular at the apex, leafy and with numerous axillary panicles. *Leaves* 6–10 in.; leaflets 2–3 by ½–¾ in.; petiolule ⅙–⅕ in. *Flowers* very small. *Staminal tube* globosely cup-shaped, 6-lobed; lobes ovate, obtuse, minutely apiculate. *Anthers* minutely and very sparingly pilose. *Stigmas* 3, sessile, linear-trigonous, glabrous.

6. **A. rubiginosa,** *Griff. mss. under Aphanamixis;* ferruginous on oung parts calyx lower surface of leaves &c., leaflets numerous approxinated subopposite ovate-oblong acuminate very shortly petiolulate somehat farinaceous base conduplicate deeply cordate, lateral nerves numerous ubparallel spreading, panicles pyramidal base bulbous, flowers racemose rimerous, calyx companulate trifid, anthers 6, ovary 3-celled, cells -ovuled.

MALACCA; *Griffith, Maingay.*

A big tree, large in all its parts. *Petioles* thickened at base; *leaflets* 3–9 by 1–2½ in. r larger. *Panicles* 9–18 in. long; flowers ¼ in. long, calyx ⅛ in. long, petals orange-ellow, aperture of the staminal tube very small. *Ovules* superposed.

†† Petals 3. Anthers 8 or 10.

7. **A. spectabilis,** *Miq. Ann. Mus. Bot. Lugd.-Bat.* iv. 37; leaflets 11–13 opposite or subopposite oblong acutely subacuminate glabrescent shining glaucescent beneath petiolulate base obtuse, male panicles pedunculate with alternate unequal branches, calyx stellate-puberulent obtusely 3-lobed short, petals 3 imbricated substellate-velutinous along the back, staminal tube urceolate glabrous shortly and obtusely 8-dentate, anthers 8 (-9?) sublinear acute subexserted at the apex, fruit obovoid-pyriform. Aglaia spectabilis, *Hort. Calcutt. ex Miq.* l.c.

RANGOON, *McClelland.*

Indumentum of young parts lepidote and mixed with stellate tawny hairs. *Leaves* 15 in. long; petioles angular; leaflets 4–8 by 1½–2 in.; petiolules ¼–⅓ in. *Male panicles* nearly 1½ ft. long, female short. *Fruit* 1¼–1¾ by 1–1⅛ in.

The description of the flowers is taken from Miquel, that of the fruit is given from a specimen in Hb. Kew. Mr. Kurz, in Journ. Asiat. Soc. Beng. xxxix. ii. 72 (1870), declares that the species as described by Miquel is identical with the male plant of A. cucullata, *Roxb.* Sphærosacme spectabilis, *Wall. ex Voigt Hort. Suburb. Calcutt.* 136, from Nepal, may be a synonym.

8. **A. rubescens,** *Hiern;* leaflets 13-15 opposite oblong subacuminate or obtuse glabrate base obtuse, panicles supra-axillary divaricately branched crowded near the ends of the branches, pedicels short, petals 3, staminal tube subglobose crenulate, anthers 10 linear, stigma conical sulcate.

SINGAPORE, *Maingay.*

Young parts and inflorescence puberulent. *Leaves* 1½–2½ ft. long; leaflets 3–7 by 1⅓–2⅓ in., lateral nerves about 10 on each side of midrib, depressed beneath; petiolules ⅖–⅗ in. *Panicles* ½–1 ft. long, many-flowered; flowers ⅒ in. diam. *Calyx* short, irregularly toothed. *Petals* and *staminal tube* glabrous. *Disk* annular. *Ovary* hairy, 5?-celled.

††† Petals 4. Anthers 8.

9. **A. Lawii,** *Benth. & Hook. f. Gen. Pl.* i. 335; pallid, young parts panicles calyces and fruit lepidote, leaflets 3–5 alternate or subopposite more or less elliptic obtusely acuminate nearly or quite glabrous base more or less narrowed, panicles pyramidal falling short of the leaves, flowers racemose, calyx short truncate 4-toothed, petals 4, anthers 8 rarely 7, ovary 3-celled cells 1-ovuled, fruit 3-valved pear-shaped. *Bedd. Fl. Sylv.* t. 133. Epicharis exarillata, *Nimmo in Grah. Cat. Bomb. Pl.* 31. Nimmonia Lawii, *Wight in Calc. Journ. Nat. Hist.* vii. 13. Nemedra Nimmonii, *Dalz. in Dalz. & Gibs. Bomb. Fl.* 37.

WESTERN PENINSULA, from the Concan to Malabar.

A middling-sized tree; scales yellowish brown. *Leaves* 6–9 in. long; leaflets 3–5 by 1½–2 in., axils of lateral veins sometimes with hairy gland-like excrescences (galls?), petiolules ⅙–½ in. *Flowers* ⅒–⅛ in. long, white, rarely 5-merous. *Fruit* 1 in. long, abounding in white resinous juice.

†††† Petals 5. Anthers 10.

10. **A. Maingayi,** *Hiern;* subglabrous, leaflets 3–4 elliptic obtusely acuminate glabrous shining above alternate or subopposite base more or less narrowed shortly petiolulate, panicles shorter than the leaves, flowers pentamerous, calyx short cleft, anthers 10 included, ovary minutely hirsute 3-celled, stigmas 3 connate sessile.

MALACCA, *Maingay.*

Leaves numerous, 4–6 in. long; leaflets very minutely pellucid-punctate, 3–4½ by 1–1¾ in. *Flowers* 1/12 in. long; petals slightly adherent at their base to the staminal tube.

11. **A. decandra,** *Hiern;* leaflets 7–13 opposite oblong acuminate base somewhat cuneate or nearly rounded subglabrescent, opposite submembranous, sepals very short, anthers 10, ovary (3-) 5-celled cells 1-ovuled, fruit globose-obovoid 5-furrowed umbilicate 5-celled and -seeded. Aglaia? decandra, *Wall. in Roxb. Fl. Ind. Ed. Carey*, ii. 427. Sphærosacme fragrans, *Wall.* l.c. 429; *Voigt Hort. Suburb. Calcutt.* 135. Lansium (sp.) *W. & A. Prodr.* i. 119; *Benth. & Hook. f. Gen. Pl.* i. 334. S. decandra, *Wall. Cat.* 1276.

NIPAL, *Wallich;* Sikkim, alt. 2–4000 ft., *Hb. Griffith, J.D.H.;* MALAYAN PENINSULA, *Maingay.*

A large spreading tree with thick trunk. *Leaves* about 1 ft. long; leaflets 1½–8 by by ⅝–2 in.; petiolules short. *Male panicles* equalling the leaves; flowers very fragrant, on slender pedicels. *Petals* 5. *Fruit* about 1½ in. diameter, capsular.

SECT. II. *Style* long.

12. **A.? Championii,** *Benth. & Hook. f. Gen. Pl.* i. 335; leaflets 4–6 abruptly pinnate opposite obovate-cuneate glabrous and shining subcoriaceous without prominent nerves shortly petiolulate apex rounded, panicles supra-axillary slightly puberulent about half the length of the leaves, flowers pedicelled tetramerous oblong, calyx short, petals oblong very slightly or scarcely imbricated in bud at length spreading or reflexed, apex obtusely pointed, staminal tube widely tubular obtusely dentate bearing inside near apex 8 equal short 2-celled anthers in one row, ovary glabrous 4-celled cells 1- (or 2- cf. fig. in *Hb. Kew.*) ovuled, style columnar, nearly as long as the staminal tube, stigma capitate, disk 0, fruit globose-pyriform 1–2-seeded, seeds exalbuminous with aril. *Thwaites Enum.* 409; *Bedd. Anal. Gen.* lv. Dysoxylon Championii, *Hook. f. & Thoms. ex Thwaites*, 61.

CEYLON; Central province, up to 4000 ft. alt., *Thwaites.*

A large tree, with leaves 4–7 in. long; leaflets 2–4 by ¾–1½ in.; petiolules ⅛–⅜ in. *Flowers* yellowish, ¼ in. long. *Fruit* 1 in. long.—Differs from the type of Amoora by the elongated style and by abruptly pinnate leaves. Perhaps a new genus. Mr. Kurz (in Journ. Asiat. Soc. Beng. xxxix. ii. 72, 1870) declares it to be a species closely allied to Carapa (Xylocarpus) carnosula, *Zoll.*

12. WALSURA, Roxb.

Trees. *Leaves* 1–5-foliolate; leaflets opposite, quite entire, pale beneath. *Panicles* axillary and terminal; flowers small hermaphrodite. *Calyx* short, 5-fid or -partite, imbricated. *Petals* 5, ovate-oblong, spreading, slightly imbricated or subvalvate. *Filaments* 10 or 8, linear or subulate, free or connate in a tube; anthers terminal or inserted in the notch at the apex of the filament. *Disk* usually annular, fleshy. *Ovary* short, 2–3-celled, imbedded in the disk, style rather short; stigma turbinate-capitate, 2–3-dentate; ovules 2 in each cell. *Fruit* baccate, shortly tomentose, indehiscent, 1- rarely 2-celled and -seeded; seed inclosed in a fleshy aril, exalbuminous.—DISTRIB. Genus of about 10 species limited to India and the Indian Archipelago. Occasionally, according to Kurz, the petals are increased to 8 and the stamens to 15.

Imperfect specimens from Silhet (*Wallich*, n. 8113), with short spicate inflorescence and with trifoliolate leaflets, the terminal one on a long petiolule, appear to differ from the known species of the genus. W. trichostemon, *Miq. in Ann. Mus. Bot. Lugd.-Bat.* iv. 60, from Siam, is said to differ from the undermentioned by its pilose anthers; Mr. Kurz in Journ. Asiat. Soc. Beng. xxxix. ii. 72 (1870) unites it with W. villosa, *Wall.*

SECT. I. Euwalsura. *Filaments* linear.

* *Leaflets solitary.*

1. **W. Gardneri,** *Thwaites Enum.* 61; leaflet solitary elliptic-oblong obtusely acuminate glabrous whitish beneath, base obtusely narrowed, petiolule short articulated to the longer petiole, filaments free hairy apex bifid, anthers between the teeth of the filaments, fruit obovoid ellipsoidal apiculate base narrow. *Bedd. Anal. Gen.* lvi.

CEYLON; in the Central province, alt. 2–4000 ft.

A small tree of 10–12 ft. *Leaflets* 3–6 by 1½–2½ in.; petiolule 1/12–¼ in. *Petiole* ½–¾ in. *Petals* somewhat imbricated. *Fruit* 1 in. long, covered with a short tomentum.

** *Leaflets* 3–5.

† Filaments connate half way or more.

2. **W. tubulata,** *Hiern*; leaflets 3 ovate- or elliptic-oblong obtusely acuminate shining above glaucous beneath quite glabrous, base somewhat narrowed, panicles scarcely equalling the leaves, calyx partite, staminal tube glabrous outside thinly pubescent inside equally 10-lobed at apex, lobes bifid receiving the apiculate anthers within the notches.

SIKKIM HIMALAYA and KHASIA MTS., *Herb. Griffith.*

Shoots and *petioles* rough with lenticular specks. *Leaves* 8–15 in.; leaflets 3–9 by 1½–3 in.; petiolules ¼–⅞ in., or the terminal ones longer. *Flowers* ¼ in. long.

3. **W. ternata,** *Roxb. Hort. Beng.* 90; *Fl. Ind.* ii. 389; leaflets 3 lanceolate-oblong or oblong obtuse glabrous and shining whitish beneath obtuse at base, axillary panicles shorter than the leaves, flowers milk-white, calyx partite, staminal tube thinly pubescent on both sides 10-fid halfway, free portion of filament alternately notched and shorter, anthers apiculate. *Bedd. Anal. Gen.* lvi. Cfr. Xylocarpus? Antila, *Hb. Ham.*; *Wall. Cat.* 4893.

The PANJAB, at Sheikpura; WESTERN PENINSULA; in the Godavery forests and in the hilly districts of the Northern division of the Madras Presidency, *Beddome.*

A small tree, subglabrous. *Leaves* about 8 in.; leaflets 4–5 by 1 in.; petiolules $\frac{1}{3}$–$\frac{2}{3}$. *Panicles* puberulent; flowers $\frac{1}{8}$ in. long. "*Disk* salver-shaped with a large high callous margin. *Berry* narrow oblong." *Beddome.*

†† Filaments connate one third way or less.

‡ *Leaflets usually* 3 *only.*

4. **W. piscidia,** *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 387; leaflets subternate elliptic obtuse often retuse glabrous shining pale beneath, flowers pentamerous, petals imbricated, staminal tube half the length of the petals equally 10-cleft for two thirds of its length divisions all bifid at apex hairy above, ovary 2- rarely 3-celled, fruit covered with a short tomentum. *Wight Ill.* i. t. 55; *Beddome Anal. Gen.* lvi. t. 8, f. 6; *Wall. Cat.* 1265; *Dalz. & Gibs. Bomb. Fl.* 37. Heynea trifoliata, *A. Juss. in Mém. Mus.* xix. 235. Trichilia coriacea, [*Rottl.!*]; *Wall. Cat.* 1265. Trichilia trifoliata, *Wall. Cat.* 8093.

WESTERN PENINSULA; Malabar and Travancor. CEYLON, *Walker.*

Leaves 2–7 in.; leaflets 1–4 by $\frac{2}{3}$–1$\frac{2}{3}$ in.; petiolules $\frac{1}{16}$–$\frac{1}{3}$ in., terminal one longer. *Flowers* $\frac{1}{3}$ in. long, sordid-yellowish; bracts minute, caducous. *Fruit* egg-shaped, $\frac{2}{3}$ in. long.—The bark acts as a fish poison.

‡‡ *Leaflets* 5.

5. **W. villosa,** *Wall. Cat.* 1264; young parts tawny-velutinous, leaflets 5 elliptic or ovate obtuse sometimes shortly acuminate glabrescent whitish beneath, at least when young, panicles equalling or shorter than the leaves, calyx partite, filaments equal thinly pubescent narrowing upwards but not subulate connate one third way from base, anthers terminal. *Wight & Arn. Prodr.* i. 120. Trichilia? villosa, *Wall.* l.c.

TENASSERIM, at Moulmein, *Wallich, Griffith.*

Leaves 6–10 in.; leaflets 2–4 by $\frac{3}{4}$–2 in., petiolules $\frac{1}{4}$–2 in. or the terminal ones longer. *Flowers* velutinous.—Schmidelia (sp.), *Wall. Cat.* 8056, also from Moulmein with narrowly ellipsoidal acuminate shortly tomentose fruit scarcely 1 in. long, probably belongs to this species.

6. **W. hypoleuca,** *Kurz Rep. Veg. Andam. ed.* ii. 33; *in Journ. Asiat. Soc. Beng.* xli. ii. 1872, 296; leaflets 5 elliptic to oblong-lanceolate acuminate quite glabrous chartaceous glaucous beneath smooth, panicles puberulent shorter than the leaves, calyx partite, filaments linear densely pubescent on both sides not subulate free except base equal, ovary densely tawny-tomentose, berries (immature) hoary-velutinous oblong acuminate. W. sp. *Kurz Rep. Veg. Andam. ed.* i. p. iv.

SOUTH ANDAMAN ISLAND; in the Jungles especially of the interior, common, *Kurz.*

Leaves 9–16 in.; leaflets 4–6 by 1$\frac{1}{2}$–3 in.; petiolules $\frac{1}{3}$–1 in., terminal ones longer. *Flowers* $\frac{1}{3}$ in. long, white. *Petals* 5, occasionally 8. *Stamens* 10, sometimes as many as 15. *Fruit* (young) $\frac{1}{2}$ in. long.—I have followed Mr. Kurz; but perhaps the flowering and fruiting specimens belong to different species.

7. **W. neurodes,** *Hiern*; leaflets 5 elliptic shortly acuminate shining above strongly nerved beneath glabrous base obtuse, panicles equalling or exceeding the leaves puberulent, filaments linear equal densely pubescent base connate, anthers subterminal, fruit 1–2-celled, aril thin.

MALACCA, *Griffith, Maingay.*

Leaves 4–12 in.; leaflets 2–6 by 1–2 in., faintly pellucid-punctate; petiolules $\frac{1}{8}$–$\frac{1}{3}$ in. or terminal one longer. *Flowers* $\frac{1}{3}$ in. long. *Ovary* 2-celled; stigma discoid; ovules 2 in each cell, collateral, horizontal. *Fruit* ellipsoidal, $\frac{1}{2}$–$\frac{3}{4}$ in. long.

SECT. II. Surwala. *Filaments* subulate.

8. **W. robusta,** *Roxb. Hort. Beng.* 32; *Fl. Ind.* ii. 386; subglabrous, shoots and petioles rough with scabrous specks, leaflets 5 sometimes 3 ovate or elliptic acuminate shining, panicles nearly as long as the leaves dense puberulent, calyx partite, filaments equal free subulate pubescent except apex, anthers terminal, ovary 2-celled, berry egg-shaped or subglobose. *Wall. Cat.* 1266, 8110, 8111, 8112. Surwala robusta, *Roem. Synops.* i. 108. Monocyclis robusta, *Wall. ex Voigt Hort. Suburb. Calcutt.* 135. Scytalia glabra, *Hb. Ham. ex Wall. Cat.* 8048 E, *not other letters.*

SILHET, *Wallich;* ASSAM, *Hamilton;* KHASIA MTS. and TENASSERIM, *Griffith,* &c.; ANDAMANS, *Kurz under name of* W. villosa *in Rep. Andam. ed.* 2, 33.

A large timber tree. *Leaves* 6–12 in.; leaflets 2–6 by 1–3 in.; petiolules $\frac{1}{4}$–$\frac{1}{2}$ in. or the terminal one longer. *Flowers* $\frac{1}{6}$ in. long, white. *Staminal tube* white; anthers yellow. *Fruit* $\frac{1}{2}$–$\frac{2}{3}$ in. long.

13. **HEYNEA,** Roxb.

Trees or rarely shrubs. *Leaves* 5–11-foliolate; leaflets opposite, quite entire. *Panicles* terminal and axillary, corymbose, long-peduncled; flowers rather small, hermaphrodite. *Calyx* short, 4–5-fid, imbricated. *Petals* 4–5, oblong, suberect, somewhat imbricated. *Staminal tube* 8- or 10-fid; lobes linear, bidentate at apex, bearing the anthers between the linear teeth. *Disk* annular, fleshy. *Ovary* immersed in the disk, 2–3-celled, narrowing into the short style; stigma 2–3-dentate, with a thickened ring at the base; ovules 2 in each cell. *Fruit* capsular, 1-celled, 2-valved, 1-seeded, glabrous. *Seed* arillate, exalbuminous; aril thin, white; cotyledons hemispherical.—DISTRIB. A genus of 1–3 species, limited to India and the Indian Archipelago.

1. **H. trijuga,** *Roxb. Hort. Beng.* 33; *in Bot. Mag.* t. 1738; *Cor. Pl.* iii. 56, t. 260; *Fl. Ind.* ii. 390; leaflets 5–11 ovate oblong or lanceolate acuminate glabrous above, paler and glabrate or pubescent beneath usually obtuse-based, panicles nearly equalling the leaves, calyx pubescent or subglabrate 5–4-fid, petals 5–4 glabrous or puberulent, staminal tube glabrous or puberulent outside usually pubescent inside, filaments 10 or rarely 8 alternately rather shorter, capsule round. *Grah. Cat. Bomb. Pl.* 31; *Adr. Juss. in Mém. Mus.* xix. t. 18, f. 17; *Dalz. & Gibs. Bomb. Fl.* 38; *Wall. Cat.* 1258; *Brandis Fl. Sylvat.* 70. Leea lævis, *Hb. Heyne ex Wall.* l.c. H. quinquejuga, *Roxb. Cat.* 90; *Fl. Ind.* ii. 391; *Wall. Cat.* 1259. H. affinis, *Adr. Juss.* l.c. 275; *Beddome Fl. Sylvat.* t. 134; *W. & A. Prodr.* i. 121. Walsura (Heynea) pubescens, *Kurz in Journ. Asiat. Soc. Beng.* xli. ii. 297. H. connaroides, *Wight ex Voigt Hort. Suburb. Calcutt.* 136; *Drury Ind. Fl.* i. 166. Zanthoxylon? connaroides, *W. & A. Prodr.* i. 148. Zygophyllum? connaroides, *W. & A. ex Wight Cat.* n. 553.

Forests of OUDH and the HIMALAYA, from Nipal to Bhotan; KHASIA MTS., PEGU, BENGAL, PENANG; WESTERN PENINSULA from the Concan southwards.

A tree sometimes attaining a large size. *Leaves* 4–15 in. long; leaflets 2–6$\frac{1}{2}$ by $\frac{3}{4}$–3 in.; petiolules $\frac{1}{8}$–$\frac{5}{8}$ in. long or the terminal ones longer. *Flowers* white. *Capsules* $\frac{1}{3}$–$\frac{1}{2}$ in. long.—A specimen from Malacca in very young flower, gathered by the late Dr. Maingay (Distrib. n. 346), with the leaflets of nearly the same colour on both surfaces, may belong to this species. Mr. Kurz, in Journ. Asiat. Beng. xxxix. ii. 72 (1870), states that H. sumatrana, *Miq. Fl. Ind. Bat. Suppl.* i. 505, from W. Sumatra, is identical with H. quinquejuga, *Roxb.*

14. **BEDDOMEA,** Hook. fil.

Trees or shrubs. *Leaves* 1–5-foliolate, opposite or subopposite; leaflets quite entire. *Racemes* or *panicles* axillary, few-flowered; flowers of moderate size, subglobose hermaphrodite. *Calyx* 4–6-partite, with broadly ovate imbricated segments. *Petals* 4–6, orbicular, much imbricated. *Staminal tube* short or globose, crenulate; anthers 5–6, sessile, partially or wholly exserted; connective thick; cells narrow, marginal, at length confluent at the apex. *Ovary* short, hairy, more or less immersed in the inconspicuous disk, 3-celled; cells 2-ovuled; style short thick, stigma 3-lobed, pyramidal. *Fruit* coriaceous, ellipsoidal ovoid or subglobose, often acute at the apex, more or less ribbed and densely covered with closely set scurfy and stellate tomentum, tardily dehiscent, 2–3-celled; septa thin and often obsolete. *Seeds* 3–5, large, more or less angular, exarillate (*Beddome*).—Distrib. An endemic genus.

1. **B. indica,** *Hook. f. in Benth. & Hook. f. Gen. Pl.* i. 336; young shoots somewhat lepidote, leaflets 3 elliptic obtuse glabrate base somewhat cuneate, panicles lax racemose, pedicels usually long, flowers 5–4-merous, staminal tube short, anthers 5, fruit ovoid to oblong. *Bedd. in Trans. Linn. Soc.* xxv. 212; *Anal. Gen.* lvi.; *Fl. Sylvat.* t. 135 (smaller figure).

Western Peninsula, from Kurg to Cape Comorin, ascending to 3–4000 ft. Anemia rocks, Sispara, *Hb. Wight*, 417.

A twiggy shrub. *Leaves* 6–12 in., leaflets 3–7 by $1\frac{1}{2}$–3 in.; petiolules $\frac{1}{3}$–1 in. *Flowers* $\frac{1}{5}$–$\frac{1}{4}$ in. diam. *Fruit* 1–$1\frac{1}{2}$ in. long, more or less furrowed, rough with close-set rusty scales.

2. **B. simplicifolia,** *Beddome Fl. Sylvat.* t. 135; young parts with scurfy scales, leaflets solitary elliptic or narrowly so subacuminate glabrescent base obtuse or somewhat cuneate, panicles or racemes from much shorter than the leaves to much longer or the flowers occasionally solitary, flowers 5–6-merous, staminal tube large and globose or smaller, fruit as in the genus.

Western Peninsula; from the S. Concan to the Anamallay hills.

A tree up to 3 ft. in girth and 25 in height. *Leaves* 3–6 by $1\frac{1}{4}$–$3\frac{1}{4}$ in.; petioles $\frac{1}{3}$–1 in., much thickened and quasi-articulated near the apex. *Flowers* variable in size, $\frac{1}{12}$–$\frac{5}{12}$ in. diam; pedicels $\frac{1}{12}$–$\frac{1}{4}$ in. long. *Fruit* oblong, size of pigeon's egg.—Beddome gives the following varieties.

Var. *α*; racemes much longer than the leaves, flowers $\frac{1}{3}$–$\frac{5}{12}$ in. diam. rufous-tomentose.—Wynaad, Tinnevelly hills and Travancor, alt. 2–4000 ft.

Var. *β*, *parviflora;* panicles very small not much longer than the petioles, flowers $\frac{1}{12}$–$\frac{1}{6}$ in. diam. rufous-tomentose.—Anamallay and Pulney hills, alt 3–4000 ft.

Var. *γ*, *racemosa;* racemes filiform longer than the leaves, pubescence scurfy.—Wynaad, Coorg, S. Canara.

15. **CARAPA,** Aubl.

Glabrous littoral trees. *Leaves* 2- or 4- or sometimes 6-foliolate; leaflets opposite quite entire feebly nerved. *Panicles* lax, axillary, flowers hermaphrodite. *Calyx* 4-fid, short. *Petals* 4, reflexed, contorted sinistrosely (as seen from within). *Staminal tube* urceolate-globose, 8-dentate at apex, teeth bipartite; anthers 8, 2-celled, just included, sessile at top of tube, alternating with the teeth. *Disk* fleshy, cup-shaped, adherent to the base of the ovary. *Ovary* 4-celled, 4-sulcate; cells 2–8-ovuled; style short, stigma discoid. *Fruit* capsular, irregularly globose, large, 6–12-seeded; pericarp fleshy dehiscing by 4 valves opposite the obliterated dissepiments. *Seeds* large, thick, angular; testa hard, spongy, aril 0. hilum large, ventral; cotyledons amygdaloid.—DISTRIB. A genus of scarcely more than 2 species, one Tropical American, the other from Tropical Asia, both however occurring in Tropical Africa on the west and east coast respectively.

The character of the genus given above is based on the latter species; it constitutes Kœnig's genus Xylocarpus.

1. **C. moluccensis,** *Lam. Encyl. Méth.* i. 621; leaflets from ovate to obovate usually obtuse very shortly petiolulate, panicles lax shorter than the leaves sometimes in simple racemes. *Bedd. Flor. Sylv.* t. 136; *Wall. Cat.* 1274. C. indica, *Juss. in Dict. Sc. Nat.* vii. 32. C. obovata, *Blume Bijdr.* 179. Xylocarpus Granatum, *Koen. Naturf.* xx. 2; *Adr. Juss. in Mém. Mus.* xix. t. 20, f. 22. X. obovatus, *Adr. Juss.* l.c. 244. X. moluccensis, *Roem. Synops.* i. 124. Granatum littoreum, *Rumph. Amb.* iii. 92, t. 61. Monosoma littorata, *Griff. Notul.* iv. 502. Cfr. Guarea oblongifolia, *Griff.* l.c. 503.

Muddy seacoasts throughout India and Ceylon.—DISTRIB. Tropical Africa, Malayan Archipelago and N. Australia.

Leaves 4–8 in.; leaflets 2–5 by 1–2½ in. *Panicles* 1–5 in. long; flowers ⅙–⅕ in. long, yellowish. *Fruit* 3–4 in. diam.

16. **SOYMIDA,** Adr. Juss.

A lofty glabrous tree. *Leaves* paripinnate; leaflets opposite, entire, obtuse. *Panicles* axillary and terminal; flowers greenish-white, pentamerous. *Calyx* composed of 5 short imbricated sepals. *Petals* free, imbricated, obovate, unguiculate, spreading. *Staminal tube* short, cup-shaped, 10-cleft, lobes bidentate; anthers 10, sessile between the teeth, short. *Disk* flat. *Ovary* 5-celled; cells alternate with the sepals, each with about 12 biseriate pendulous ovules; style short, stigma broad, fleshy. *Capsule* septifragally 5-valved, woody; valves consisting of two plates, separating from the 5-winged axis. *Seeds* numerous, flattish, winged at both ends, albuminous; cotyledons foliaceous.—DISTRIB. One endemic species; two other species from East Tropical Africa have been conjecturally referred to this genus.

1. **S. febrifuga,** *Adr. Juss. in Mém. Mus.* xix. 251, t. 22, f. 26; leaflets 6-12 elliptic or oblong base usually oblique shortly petioluled, panicles often equalling the leaves branches divaricate. *W. & A. Prodr.* i. 122; *Dalz. & Gibs. Bomb. Fl.* 38; *Bedd. Fl. Sylvat.* t. 8; *Forest Reports Madras.* 1866–67, t. 2; *Brandis Fl. Sylvat.* 71. Swietenia febrifuga, *Roxb. Monography; Cor. Pl.* i. t. 17; *Fl. Ind.* ii. 398; *Grah. Cat. Bomb. Pl.* 32; *Wall. Cat.* 1267. S. Soymida, *Duncan Tent. Inaug. de Sw. S.* (1794). S. rubra, [*Rottl.*] *Wall. Cat.* 4890.

Hilly districts of NORTH WESTERN CENTRAL and SOUTHERN INDIA, extending southward to Travancor; CEYLON.

Yields a very hard dull red-coloured wood, one of the most durable. *Leaves* nearly evergreen, 9–18 in.; leaflets 1½–5 by ⅚–2¾ in.; petiolules mostly very short. *Flowers* about ⅙ in. long; bracts ovate-deltoid, small. *Capsule* smooth, black when ripe, 1–2½ in. long.—Timber strong; bark bitter.

17. **CHICKRASSIA,** Adr. Juss.

A large timber tree with paripinnate leaves, alternate subopposite or opposite acuminate oblique entire leaflets, terminal panicles and 4–5-merous flowers. *Calyx* short, dentate. *Petals* oblong, free, sinistrorsely contorted (as regarded from inside) erecto-patent. *Staminal tube* cylindric, 10-crenate; anthers 10, erect, inserted within the crenatures, short. *Disk* obsolete. *Ovary* shortly stipitate, 3-celled, cells each with numerous biseriate ovules; style stout, stigma capitate. *Capsule* 3-celled, septicidally 3-valved, woody; valves consisting of two plates, separating from the 3-winged axis. *Seeds* numerous, flattish, winged below, exalbuminous; cotyledons orbicular.—DISTRIB. One endemic species.

1. **C. tabularis,** *Adr. Juss. in Mém. Mus.* xix. 251, t. 22, f. 27; leaflets 10–16 ovate more or less velvety especially beneath or nearly glabrous base obtuse shortly petiolulate, panicles erect scarcely equalling the leaves, flowers yellowish or red, fruit ellipsoidal. *W. & A. Prodr.* i. 123; *Thwaites Enum.* 61; *Wight Ill.* i. t. 56; *Bedd. Fl. Sylvat.* t. 9; *Grah. Cat. Bomb. Pl.* 32. Swietenia Chickrassia, *Roxb. Hort. Beng.* 33; *Fl. Ind.* ii. 399. Plagiotaxis Chickrassia, *Wall. Cat.* 1269. S. Sotrophola, *H. Ham. ex Wall. Cat.* l.c. p. 214. C. Nimmonii, *Grah. ex Wight* l.c. 148; *Dalz. & Gibs. Bomb. Fl.* 38. P. velutina, *Wall. Cat.* 1270. C. trilocularis, *Roemer Synops. Monogr.* i. 135. S. trilocularis, *Roxb. ex Buch. Journ.* i. 184; *G. Don Gen. Syst.* i. 688. C. velutina, *Roemer* l.c.; *Kurz in Journ. Asiat. Soc. Beng.* xlii. ii. 1873, 65. S. velutina *and* S. villosa, *Wall. ex Kurz* l.c. Cedrelæ spec. *De Cand.*? *Hb. Wight. ex Wall. Cat.* 4892. ? Cedrela velutina, *DC. Prodr.* i. 625. ? Cedrela villosa, *Roxb. Hort. Beng.* 18. ? Melia tomentosa, *Kurz. Rep. Veg. Andam.* ed. i. p. iv., *not of Roxburgh.* ? Toona velutina, *Roem. Synops. Monogr.* i. 139. ? T. villosa, *Roem.* l.c. 140. ? Cedrela odorata, *Hort. Kew. olim ex Roem.* l.c., *not Linn.*

WESTERN PENINSULA, from the Concan to Coorg; MALACCA and CEYLON; (? Tippere and the Andaman Islands).

Leaves 12–18 in.; leaflets 2–5 by 1¼–2¾ in. *Flowers* about ½–⅗ in. long. *Ovary* hairy. *Stigma* about on the level of the anthers. *Fruit* nearly 2 in. long.—The Chittagong wood tree.

18. **CEDRELA,** Linn.

Tall trees with coloured wood. *Leaves* pinnate; leaflets numerous, opposite or subopposite, entire or serrate. *Panicles* terminal and subterminal oblong; flowers white pentamerous. *Calyx* short, 5-cleft. *Petals* suberect, oval, imbricated, free. *Stamens* 4–6, free, inserted at the top of the disk, sometimes alternating with staminodes, filaments subulate; anthers widely oblong, versatile. *Disk* thick or raised, 4–6-lobed. *Ovary* sessile on the top of the disk, 5-celled; cells alternate with the calyx-lobes, each with 8–12 biseriate pendulous ovules; style filiform, stigma discoid. *Capsule* coriaceous, 5-celled, septifragally 5-valved; valves consisting of two plates. *Seeds* compressed, winged below or at both ends, with fleshy albumen; cotyledons flat, subfoliaceous.—DISTRIB. About 12 species, inhabiting Tropical Asia, Australia, and America.

1. **C. Toona,** *Roxb. ex Rottl. & Willd. in Gesell. Nat. Freunde. N. Schr.* iv. 198 (1803); *Hort. Beng.* 18; *Cor. Pl.* iii. t. 238; *Fl. Ind.* i. 635; leaflets 8–30 obliquely ovate or lanceolate acutely acuminate glabrous shining entire or serrate base obtuse petioluled, panicles drooping about as long as or exceeding the leaves, pedicels short, stamens 5 occasionally 6 or alternating with staminodes equalling the petals, capsule oblong. *W. & A. Prodr.* i. 124; *Wight Ic.* t. 161; *Bedd. Fl. Sylvat.* t. 10; *Dalz. & Gibs. Bomb. Fl.* 38; *Brandis Fl. Sylv.* 72, t. 14; *Wall. Cat.* 1272, 9041. C. febrifuga, *Blume Bijdr.* 180. C. hexandra, *Wall. in Roxb. Fl. Ind. ed. Carey* ii. 425; *Cat.* 1272. ? C. longifolia, *Wall. Cat.* 1273. C. serrata, *Royle Ill.* t. 25; *Brandis*

l.c. 73. C. australis, *F. Muell. Fragm.* i. 4, *teste Benth. Fl. Austral.* i. 387. ? C multijuga, *Kurz in Journ. Asiat. Soc. Beng.* xli. ii. 297. Toona ciliata, febrifuga, hexandra, serrata, *and* longifolia, *Roem. Synops.* i. 139, 140.—*Rumph. Herb. Amboin.* iii. t. 39.

TROPICAL HIMALAYA; from the Indus eastward, ascending to 3000 ft.; and throughout the hilly districts of CENTRAL and SOUTHERN INDIA and BIRMA (absent in Ceylon!).—DISTRIB. Java, Australia.

Leaves 1–3 ft., deciduous; leaflets 2–7 by $\frac{3}{4}$–3 in., sometimes glaucescent beneath. *Flowers* fragrant, $\frac{1}{8}$–$\frac{1}{4}$ in. long. *Petals* ciliate. *Capsule* about $\frac{3}{4}$–1 in. long, oblong.—Dr. Brandis distinguishes C. serrata from C. Toona by several characters; however, I do not find any of them constant, except that in the few examples that show it the seeds of the former have wings at the upper end only, while those of the latter have wings at both ends; it is common throughout the Himalaya, attaining an elevation of 8000 ft.—The flowers are used for dyeing: see *Buchanan, Journey*, i. 215, iii. 288.

19. CHLOROXYLON, DC.

A moderate-sized tree. *Leaves* abruptly pinnate; leaflets obtuse, oblique, entire. *Panicles* terminal and axillary, pubescent; flowers small pentamerous. *Calyx* deeply lobed. *Petals* spreading, unguiculate, imbricated in bud. *Stamens* 10, inserted in the depressions of the disk, free; filaments filiform-subulate, the alternate ones rather longer; anthers small, versatile. *Disk* thick, 10-lobed, pubescent. *Ovary* pubescent, immersed in the disk; 3-lobed, 3-celled; cells about 8-ovuled; style short, slender, glabrous, stigma small, capitate. *Capsule* coriaceous, 3-celled, loculicidally 3-valved. *Seeds* compressed, exalbuminous; margins angular, winged above; cotyledons plano-convex.—DISTRIB. One endemic species.

1. **C. Swietenia,** *DC. Prodr.* i. 625; leaflets 20–40 opposite subopposite or alternate glabrous pale and dotted on lower surface base very unequal shortly petioluled, panicles scarcely as long as the leaves, pedicels longer than the flowers, capsule glabrous oblong dark brown. *W. & A. Prodr.* i. 123; *Wight Ill.* i. t. 56 *bis*; *Grah. Cat. Bomb. Pl.* 32; *Bedd. Fl. Sylvat.* t. 11; *Brandis Fl. Sylvat.* 74; *Dalz. & Gibs. Bomb. Fl.* 39; *Thwaites Enum.* 61; *Wall. Cat.* 1268. Swietenia Chloroxylon, *Roxb. Cor. Pl.* i. t. 64; *Fl. Ind.* ii. 400.

WESTERN PENINSULA, from the Concan to the Nilghiris; CEYLON.

Young parts petioles and inflorescence covered with grey puberulence; heartwood with a beautiful satin lustre and fragrant. *Leaves* 5–9 in.; leaflets $\frac{2}{3}$–1 $\frac{1}{3}$ by $\frac{1}{4}$–$\frac{5}{8}$ in. *Flowers* $\frac{1}{4}$ in. wide when open. *Capsule* 1 in. long by $\frac{1}{2}$ in. thick.—Indian Satinwood.

MELIACEA PENANGIANA, *Wall. Cat.* 4889, from Penang, consists of 3 unnameable and apparently diverse species, one of which is probably a *Canarium*.

MELIACEA RUGOSA, *Wall.* l.c. 4891, from Penang is probably not Meliaceous.

ORDER XXXVIII. CHAILLETIACEÆ. (By J. D. Hooker.)

Trees or shrubs. *Leaves* alternate, quite entire; stipules 2, deciduous. *Flowers* small, unisexual or polygamous, in corymbose cymes; peduncles sometimes adnate to the petiole. *Sepals* 5, free or connate, sometimes unequal, imbricate. *Petals* 5, free, subperigynous, equal or unequal, notched or 2-fid, with often an inflexed lamina, which is adnate to the face of the petal, usually open in æstivation. *Stamens* 5, subperigynous, all or some only fertile, free or adnate to the corolla; anthers oblong, connective often thickened at the back. *Disk* of 5 glands or scales, or a 5-glandular or -lobed cup. *Ovary* free, pubescent or villous, 2–3-celled; styles 1–2–3, free or more or less connate, stigmas simple or capitate; ovules anatropous in pairs from the top of each cell, pendulous. *Drupe* pubescent or hispid, oblong transversely oblong or didymous, compressed; epicarp entire or dehiscent; putamen indehiscent or not, 1–3-celled, cells 1-seeded. *Seed* pendulous, hilum broad, testa membranous, albumen 0; embryo large, cotyledons thick, radicle small superior.—A small chiefly tropical order, of 3 genera and about 40 species.

1. **CHAILLETIA,** DC.

Flowers polygamo-monœcious. *Sepals* 5, unequal, united at the base or above it, obtuse. *Petals* 5, 2-lobed, narrow, free. *Stamens* 5, sometimes slightly adnate at the base to the petals. *Disk* of 5 quadrate scales placed opposite the petals. *Ovary* 2–3-celled.—Distrib. Tropical Asia, Africa, and especially America; species about 30.

1. **C. gelonioides,** *Hook. f. in Gen. Plant.* i. 341; branchlets minutely pubescent, leaves glabrous elliptic or elliptic-lanceolate or -obovate abruptly acuminate or caudate-acuminate narrowed into the very short petiole, flowers in small cymes. *Bedd. Fl. Sylv. Anal. Gen.* 59, t. 9, f. 1. C. sumatrana, *Miquel Fl. Ind. Bat. Suppl.* 329. Moacurra gelonioides, *Roxb. Fl. Ind.* ii. 70; *Baill. Etud. Gen. Euph.* 587; *Mull. Arg. in DC. Prodr.* xv. pt. 2, 227; *Thwaites Enum.* 79; *Dalz. & Gibs. Bomb. Fl.* 52. Celastrus acuminatus, *Wall. Cat.* n. 4342. Wahlenbergia, *Br. ex Wall. Cat. Index,* p. 232.

Eastern Bengal; at the foot of the Khasia Mts., and in Silhet and Chittagong; Western Peninsula, on the Ghats from the Concan southwards. Ceylon, ascending to 3000 ft.—Distrib. Sumatra.

A small subdiœcious tree. *Leaves* 2–4 by $\frac{3}{4}$–2 in., rather thin, nerves reticulate, pale when dry, the young pilose or silky beneath; stipules pubescent, old quite glabrous beneath. Male fl. about $\frac{1}{6}$ in. diam. *Sepals* subequal, obtuse, hoary. *Petals* as long, narrow obovate, glabrous, a subquadrate scale is placed in front of each at the base. *Stamens* inserted at the very base of the calyx, or rather shorter than the petals, connective broad. Female fl. as in the male, but the anthers have no pollen. *Ovary* broad, sessile, woolly; styles 2, very short, stigma minute capitate. *Fruit* when perfect $\frac{3}{4}$–1 in. diam., transversely oblong or obcordate, 2-celled, compressed and didymous, but often only one carpel is perfect, and then it is smaller, oblong and oblique, epicarp thick, rather fleshy, dehiscing along the edges, and becoming partially reflected, exposing the yellow mesocarp which surmounts the rough crustaceous endocarp. *Seeds* oblong, testa thin; embryo the shape of the seed, radicle short.—Roxburgh erroneously describes the split epicarp as a 2-valved capsule, and the coloured fleshy mesocarp as an aril. The descriptions of Baillon and Müller are evidently taken from imperfect specimens, and probably of two different plants; they both retain Moacurra, and refer it to *Euphorbiaceæ*. Beddome describes the endocarp as divisible into two valves, but I find no trace of this in eastern specimens. Thwaites has a var. β, with leaves more or less tomentose beneath.

2. **C. Helferiana,** *Kurz in Beng. As. Soc. Journ.* xli. 1872, pt. 2, 297; branchlets terete, young hoary-pubescent, leaves elliptic-oblong or -obovate acuminate petioled young and old along the nerves silky pubescent beneath, veins very indistinct, flowers in hoary branched racemes, fruit hoary. Chaillet. (spec.) Brunoniana, *Wall. Cat.* 4038.

Tenasserim, at Tavoy, *Gomez, Helfer.*

It is difficult, in the absence of flowers, to distinguish this by characters from *C. gelonioides*; the leaves are larger, 4 inches long, more oblong, more shortly and sharply acuminate, of a brown colour when dry, with very faint slender nerves, and they are less narrowed at the base. The fruit, judging from Wallich's specimen, is smaller, though as densely hoary and of the same shape, and the epicarp dehisces in the same way.

3. **C. longipetala,** *Turcz in Bull. Mosc.* 1863, pt. i. 611; branches angular pustular, young densely tomentose leaves elliptic or elliptic-lanceolate acuminate silkily hairy beneath, especially on the nerves and pubescent on the nerves above, old scabrid beneath, cymes densely tomentose, male lax small-flowered, female short with fewer denser flowers that have longer petals.

TENASSERIM; at Mergui, *Griffith, Helfer.*

Apparently a monœcious climber; bark of branchlets pale and densely pustular, youngest fulvous-pubescent. *Leaves* 3–4½ in., dark-brown when dry, nerves strong beneath; petiole very short. MALE fl. in effuse cymes, about $\frac{1}{6}$ in. diam. *Sepals* connate into a turbinate tube, obtuse, hoary, unequal. *Petals* little longer than the sepals, broad, split to below the middle. *Stamens* equalling the petals. *Disk-scales* quadrate, crenate. *Rudimentary-ovary* minute, woolly. FEMALE fl. twice as large as the male. *Calyx* the same. *Petals* twice as long as the sepals, narrow. *Stamens* with long filaments and no pollen. *Ovary* globose, clothed with straight white hairs; style long and slender, 3-fid at the apex. *Fruit* wanting.

4. **C. deflexifolia,** *Turcz. in Bull. Mosc.* 1863, pt. i. 611, *var.* TOMENTOSA; branches terete smooth young fulvous-tomentose, leaves petioled elliptic or elliptic-oblong acute coriaceous shining above tomentose beneath, nerves strong minutely pubescent above, cymes peduncled spreading many-flowered hoary.

MALACCA, *Griffith, Maingay.*

Apparently a climber; branches black, the ultimate clothed with fulvous pubescence. *Leaves* 4–6 by 2½–3½ in., much broader than in any of the preceding species, very shortly acuminate or very acute, coriaceous and hard, dark-brown when dry; petiole stout. *Cymes* many, much branched, effuse, 2 in. diam. MALE fl. $\frac{1}{10}$ in. diam. *Calyx* divided nearly to the base; segments unequal, obtuse. *Petals* rather longer than the sepals. FEMALE fl., calyx as in the males. *Petals* half as long again as the sepals. *Stamens* long; anthers empty. *Ovary* clothed with matted wool; style very slender, 3-fid at the tip. *Fruit* unripe, hoary with fulvous tomentum.—I unite this with the Javanese *C. deflexifolia* with some doubts, the leaves being so much more tomentose beneath.

VAR.? *sordida*; leaves 3–4 by 1½–2 in., minutely pilose or pubescent and purplish-brown beneath. Sincapore, *Wallich* (Cat. n. 9016), *Maingay.*—The specimens are flowerless; Wallich's has unripe fruit quite like that of var. *tomentosa.*

5. **C. Griffithii,** *Hook. f.*; branchlets clothed with long spreading strigose hairs, leaves oblong or oblong-lanceolate acuminate cordate at the very base, hairy beneath, cymes short few-flowered, fruit oblong densely clothed with fulvous rigid hairs.

MALACCA, *Griffith, Maingay.*

A very distinct species from any of the above. *Branchlets* slender, clothed more or less laxly with hairs, $\frac{1}{10}$–$\frac{1}{6}$ in. long. *Leaves* subsessile, 4–7 by 2–3 in., glabrous above, beneath more or less clothed with long hairs, that are sometimes confined to the nerves, at others scattered over the surface. *Flowers*, female only seen, larger than its congeners, $\frac{1}{4}$ in. diam., in small few-flowered cymes. *Calyx* divided nearly to the base, densely tomentose. *Petals* not exceeding the sepals, pubescent. *Stamens* equalling the petals. *Ovary* densely clothed with rigid fulvous bristles; style very slender, 3-fid at the tip. *Fruit* 1½ in. long, 2-celled.—Griffith describes this as a shrub with the flowers whitish, capitate, and hidden under the leaves, and with 1-ovuled ovarian cell. I find however 2 ovules, as in the other species. Maingay had given this, or a variety of it, the ms. name of *lanuginosa*, his specimen having softer pubescence on the leaves than Griffith's; but the nature of the clothing of the branchlets, leaves, and fruit is far from being woolly; he further describes the styles as 2, short and distinct, which probably applies to male flowers, as in Griffith's plant it is slender and 3-fid at the apex.

6. **C. Laurocerasus,** *Planch. in Herb. Hook.;* branches terete smooth black and leaves perfectly glabrous, leaves oblong and elliptic-oblong very shortly petioled obtusely acuminate, nerves very slender, cymes very small few-flowered, fruit large hoary transversely oblong or globose when one carpel ripens.

PENANG, in every part of the hill, *Maingay.* (Sincapore? *Lobb.*)

A scandent shrub; remarkable amongst the India species for being perfectly glabrous, even the young twigs and leaves; branchlets black when dry, not pustular. *Leaves* 3–5 by 1½–2 in., on short slender petioles, coriaceous, very smooth and bright red-brown when dry. *Cymes, female* only seen, small, few-flowered, shortly peduncled. *Flowers* ⅛ in. diam. *Calyx* divided nearly to the base, lobes very rounded, nearly equal, hoary externally. *Petals* glabrous, about twice as long as the calyx. *Stamens* equalling the petals; anthers empty. *Ovary* minute, pubescent; style long, slender, 3-fid at the tip. *Fruit* fully formed 1¼ in. across, epicarp hard, endocarp thick, bony, tubercled on the surface, white inside.—Lobb's specimen is ticketed from Sincapore, but is more probably from Penang.

C. sp.? *Wall. Cat.* 7443, from Penang, *Porter*, without flower or fruit, is probably an undescribed species of *Chailletia*. It has terete branches, pubescent branchlets, narrow-oblong glabrous leaves, 5–8 in. long, with obtuse or subacute tips and rounded bases, beautifully reticulated and shining on both surfaces; the cymes are small and fulvous-pubescent.

ORDER XXXIX. **OLACINEÆ.** (By Maxwell T. Masters, F.R.S.)

Trees or shrubs rarely herbs, sometimes climbing. *Leaves* alternate, rarely opposite, simple or lobed, penni- or palminerved, exstipulate. *Inflorescence* cymose; cymes terminal, axillary, or extra axillary, sessile or more or less peduncled, rarely capitate. *Flowers* regular, hermaphrodite or unisexual, often diœcious. *Calyx* usually small, 4–5-toothed, sometimes accrescent, free, or adherent either to the ovary or to the fruit, lobes valvate or imbricate. *Petals* 3–6, valvate or imbricate, free, or more or less coherent. *Stamens* 3–15, inserted with the petals, free or adnate to them and either opposite to or alternate with them, all fertile, or some (staminodes) anantherous, disunited or more or less monadelphous; anthers erect, 2-celled, splitting longitudinally. *Disk* hypogynous, cup-shaped, perigynous or epigynous. *Ovary* free, or half-inferior, 1-celled, or imperfectly 2–3–5-celled (from the dissepiments not reaching the apex of the cavity); style simple or 0, rarely divided, stigma entire or lobed; ovules 1–5, pendulous from the apex of a central placenta, or from the side or apex of the ovarian cavity, consisting usually of a naked nucleus; funicle (or placenta?) often dilated into a thickened process, "obturator," above the ovule. *Fruit* drupaceous, or dry indehiscent, 1-celled, 1-seeded, free, or more or less adnate to the calyx-tube and disk. *Seed* pendulous, albumen fleshy, entire or lobed rarely 0; radicle superior, cotyledons leafy, flat or folded, rarely fleshy.—DISTRIB. Genera about 40, species about 190, widely distributed through the Tropics of both hemispheres.

In the following pages the arrangement of Bentham and Hooker is followed, though in all probability some of the genera, when better known, will have to be transferred elsewhere. Griffith, Miers, and following them Baillon, Engler, and others, consider the *Icacineæ* to form a separate Order, an arrangement probably more natural than that which is here followed on the ground of expediency, though Oliver's genus *Pteleocarpa* is to some extent intermediate.

TRIBE I. **Olaceæ.** *Stamens* anisomerous, or equal and opposite to the petals. *Ovary* 2–3–5-celled at the base, 1-celled at the apex, or completely 1-celled; ovules pendulous.

* *Fertile stamens anisomerous or twice or thrice the number of the petals.*

Leaves alternate. Fertile stamens 10 . . . . 1. XIMENIA.
Leaves alternate. Fertile stamens 3–5 . . . . 2. OLAX.
Leaves alternate. Fertile stamens 12–15 . . . . 3. OCHANOSTACHYS.
Leaves opposite. Fertile stamens 10 . . . . 4. CTENOLOPHON.

** *Fertile stamens isomerous with and opposite to the petals.*

Calyx adherent to the fruit. Staminodes 5. Ovary 1-celled . 5. ERYTHROPALUM.
Calyx adherent to the fruit. Staminodes 0. Ovary 3–5-celled . 6. STROMBOSIA.
Calyx not adherent to the fruit. Staminodes 5. Ovary 1-celled 7. ANACOLOSA.
Calyx adherent to the fruit. Staminodes 0. Ovary 3-celled . 8. SCHŒPFIA.

TRIBE II. **Opilieæ.** *Stamens* isomerous, opposite to the petals or lobes of the perianth. *Ovary* 1-celled, 1-ovuled.

* *Flowers monochlamydeous.*

Bracts small. Staminodes 5. Ovule erect . . . . 9. CANSJERA.
Bracts conspicuous, hop-like. Staminodes 0. Ovule pendulous 10. LEPIONURUS.

** *Flowers dichlamydeous.*

Staminodes 5 . . . . 11. OPILIA.

TRIBE III. **Icacineæ.** *Stamens* isomerous, alternate with the petals. *Ovary* 1–2-celled, with 1–2 ovules pendulous from the top of the cell; rarely perfectly 2–3-celled with 1–2 ovules in each cell.

* *Calyx cup-shaped, denticulate, valvate.*

Petals glabrous within.
  Filaments bearded, hairs curving over the anther; anthers adnate. Style subulate . . . . 12. LASIANTHERA.
  Filaments glabrous or with short hairs only; anthers pendulous. Stigma discoid . . . . 13. GOMPHANDRA.
  Filaments glabrous; anthers innate, sagittate at the base. Ovary oblique . . . . 14. APODYTES.
Petals villous within. Ovary ovoid . . . . 15. MAPPIA.

** *Calyx deeply 5-parted, lobes imbricate.*

Flowers unisexual. Ovary 1-celled . . . . 16. PHLEBOCALYMNA.
Flowers hermaphrodite. Ovary 2-celled. Fruit dry, winged . 17. PTELEOCARPA.

TRIBE IV. **Phytocreneæ.** *Flowers* (except in *Iodes*) and fruit as in *Icacineæ*. *Embryo* more developed, cotyledons broad fleshy or foliaceous. —Climbers.

Stamens alternate with the petals.
  Flowers capitate.
    Drupe echinate or bristly. Albumen deeply lobed . . . 18. PHYTOCRENE.
    Drupe smooth. Albumen slightly lobed . . . . 19. MIQUELIA.

Flowers spicate, racemose or panicled.
Staminodes 0. Stigma sessile. Albumen 0 . . . . . . 20. Sarcostigma.
Staminodes 5. Styles 2. Albumen fleshy . . . . 21. Natsiatum.
Stamens opposite to the petals. Stigma sessile . . . . . . 22. Iodes.

A milky-juiced climber. Sepals and petals imbricate. Fruit dry winged . . . . 23. Cardiopteris.

1. XIMENIA, Linn.

A shrub or low tree. *Branches* spiny. *Leaves* shortly petioled, alternate, simple, 1-nerved. *Flowers* racemose, usually hermaphrodite. *Calyx* cupular, 4–5-toothed, persistent, not accrescent. *Petals* 4–5, oblong, revolute, hairy within. *Stamens* twice the number of the petals, hypogynous; anthers innate, linear, 2-celled. *Staminodes* 0. *Ovary* sessile, superior, 4-celled; style columnar, stigma simple; ovules solitary in each cell, pendulous, anatropous. *Drupe* ovoid, 1-celled; stone solitary.—Distrib. Species, 4–5, 1 Mexican, 1 South African, 1 Bornean, 1 Polynesian, 1 widely dispersed through the Tropics of both hemispheres.

Baillon (Adansonia, iii. 128) describes the ovules as erect, but I find them as above described.

1. **X. americana,** *Willd. Sp. Pl.* ii. 230; *Roxb. Fl. Ind.* ii. 252; *W. & A. Prodr.* i. 89; *Miq. Fl. Ind. Bat.* i. pt. i. 787. X. Russelliana, *Wall. Cat.* 6784.

Eastern and Western Peninsulas, Circars, *Wight;* Belgaum, *Ritchie;* Andaman Islds., *Kurz;* Malacca, *Griffith;* Ceylon, *Thwaites.*—Distrib. Malayan Archipelago, Trop. Africa and America.

Branches spreading glabrous, covered with a red astringent bark, often ending in a spine. Young *shoots* angular. *Leaves* 1¼ by 1 in. and upwards, coriaceous, glabrous, ovate-oblong, or roundish, emarginate, base rounded, vernation conduplicate; petiole ⅙ in. *Flowers* ⅓ in., bisexual, sometimes polygamous, white, fragrant, in short racemes, which are axillary, or on the ends of thickened contracted shoots. *Rachis* terete, 4–6-flowered. *Bracts* minute. *Buds* oblong, acute. *Calyx* minute. *Petals* many times longer than the calyx, equal to the stamens in length. *Connective* thick. *Ovary* ovoid-oblong, glabrous, longitudinally sulcate, surrounded at the base by the persistent ultimately reflexed calyx; style as long as the stamens.—The fruit is edible and the wood is used as a substitute for Sandal-wood. This plant is omitted in Thwaites' *Enumeration.*

EXCLUDED SPECIES.

X.? olacioides, *W. & A. Prodr.* i. 89, is Opilia amentacea, *Roxb.*

X. ægyptiaca, *Juss. Gen.* 288; *Roxb. Fl. Ind.* ii. 233, is Balanites Roxburghii, *Planch.*

2. OLAX, Linn.

Trees or shrubs, often scandent, sometimes prickly. *Leaves* alternate, petioled, simple. *Racemes* axillary, simple, or branched. *Bracts* minute. *Calyx* minute, cup-shaped, truncate or obscurely toothed, accrescent. *Petals* hypogynous, valvate, more or less coherent, sometimes 6 in 3 pairs, or 5, 4 coherent, 1 free, rarely 5 or 3 free. *Fertile stamens* usually 3, rarely 4, 5, generally opposite the edges of the petals and attached to their base, rarely opposite their centre; anthers adnate to the filament, (versatile, *W. & A.*) oblong, 2-celled, dehiscing longitudinally. *Staminodes* 5–6, bifid, usually opposite the petals. *Ovary* free, usually surrounded by a shallow, cup-shaped, hypogynous disk, more or less 3-celled below, 1-celled above; style simple, terminal, stigma 3-lobed; ovules 3, linear, pendulous from the apex of a central placenta. *Fruit* more or less covered by the accrescent fleshy calyx; stone crustaceous, 1-celled, 1-seeded. *Seed* inverse, albuminous; embryo minute, in the apex of albumen; radicle superior.—DISTRIB. A genus of 25–30 species, natives of the tropics of the Old World.

1. **O. scandens,** *Roxb. Fl. Ind.* i. 163; *Cor. Pl.* iii. t. 102; scandent, prickly, leaves ovate oblong or oblong-lanceolate, racemes many-flowered, peduncles ascending longer than the bracts. *Wall. Cat.* 6774 A to G; *W. & A. Prodr.* i. 89; *Miq. Fl. Ind. Bat.* i. pt. i. 785; *Dalz. & Gibs. Bomb. Fl.* 27; *Thwaites Enum.* 42; *Brandis For. Flor.* 75. O. Bador, *Ham. in Wall. Cat.* 6778. O. psittacorum, *Vahl Enum.* 34, *partly.* Roxburghia baccata, *Kœn. ex W. & A. Prodr.* i. 89.

Tropical WESTERN HIMALAYA, in Kumaon; BEHAR; CENTRAL and SOUTHERN INDIA; ROHILKUND, BIRMA, TENASSERIM; CEYLON, in hot dry parts of the Island.—DISTRIB. Java.

Trunk as thick as a man's thigh. *Branches* terete, more or less puberulous, prickles stout, curved. *Leaves* distichous, 2 by 1 in., yellowish-green, glabrous or sometimes puberulous beneath; petiole $\frac{1}{12}$–$\frac{1}{8}$ in., puberulous. *Racemes* solitary, axillary, half the length of the leaves; peduncles puberulous, twice the length of the minute *bracts*. *Flowers* small, white. *Calyx* puberulous or glabrescent. *Petals* 3–5–6, irregularly cleft. *Fertile stamens* 3, anthers oblong. *Staminodes* 2-fid. *Ovary* ovoid-oblong 1-celled, 1- rarely 3-ovuled. *Drupe* ovoid or globose, 3-4ths covered by the accrescent calyx.—Variable in the form and vestiture of the leaves as well as in the degree of cohesion of the petals. From this latter cause the number of petals in different flowers appears to vary and the relative position of the fertile stamens and petals seems to be different. Wallich's *O. Bador* is rather more pubescent than the other specimens.

2. **O. imbricata,** *Roxb. Fl. Ind.* i. 164; scandent, unarmed, leaves ovate-oblong acute, racemes many-flowered, peduncles ascending scarcely longer than the bracts. *Wall. Cat.* 6775 A, B; *Miq. Fl. Ind. Bat.* i. pt. i. 785.

CHITTAGONG and MARTABAN at Amherst, *Wallich.*—DISTRIB. Java, Philippines.

Branches slender, terete, young shoots puberulous. *Leaves* distichous, 4 by 1$\frac{3}{4}$ in. and upwards, coriaceous, glabrous, base rounded; petiole $\frac{1}{4}$ in. *Racemes* axillary, compact, provided, when young with large (for the genus), ovate, concave, imbricate *bracts* so as to resemble the spikelets of a *Briza* (Roxb.), ultimately about 1 in., dichotomous, many-flowered; peduncles puberulous. *Flowers* nearly $\frac{1}{2}$ in. *Petals* 6, combined in 3 pairs. *Fertile stamens* 3, nearly as long as the 6 bifid *staminodes*. *Fruit* $\frac{1}{2}$ in., ovoid, glabrous.

3. **O. Wightiana,** *Wall. Cat.* 6779; shrubby or arborescent, leaves ovate-oblong, racemes many-flowered lax, peduncles drooping longer than the bracts. *W. and A. Prodr.* i. 89; *Dalz. and Gibs. Bomb. Fl.* 27; *Thwaites Enum.* 42; *Beddome Fl. Sylv. Anal. Gen.* t. 9, f. 2. O. lucida, *Heyne in Wall. Cat.* 6777. O. psittacorum, *Vahl Enum.* 233 *partly ex W. & A. Prodr.* i. 89. O. zeylanica, *Wall. Cat.* 6777 B?.

WESTERN PENINSULA, from the Concan southwards; MALACCA, *Griffith;* CEYLON, in the warmer parts of the island.

A shrub or small tree (Beddome), a scandent shrub (Dalz. and Gibs.). *Branches* terete, glabrous. *Leaves* 3–4 by 1$\frac{1}{2}$ in.; glabrous, shining above, paler beneath; petiole $\frac{1}{3}$ in., glabrous or puberulous. *Raceme* 1 in., axillary, solitary or clustered, simple or branched; peduncles $\frac{1}{3}$ in., distichous. *Flower-buds* cylindric-clavate. *Flower* $\frac{1}{3}$–$\frac{1}{2}$ in. *Calyx* cupular, puberulous. *Petals* 5. *Fertile stamens* 3, half the length of the petals. *Staminodes* 5, bifid, nearly as long as the petals. *Ovary* ovoid. *Fruit* oblong, nearly covered by the closely adherent glabrous calyx.

VAR. 1. *bracteata*, racemes elongated half as long as the leaves, bracts 2–3 times longer than the peduncles ovate leafy. — Bombay, *Law*. This may be merely an accidental variation.

4. **O. zeylanica,** *Linn.; DC. Prodr.* i. 532; arborescent, leaves ovate acuminate or ovate-lanceolate, racemes many-flowered, peduncles ascending scarcely exceeding the bracts. *Wall. Cat.* 6776 A, 6776 B?; *W. & A. Prodr.* i. 88; *Thwaites Enum.* 42; *Beddome Fl. Sylv.* lx.

CEYLON, southern parts of the island, *Thwaites*.

A small tree. Young *branches* acutely angled, glabrous, transversely wrinkled, loosely divaricate. *Leaves* 2 by $\frac{3}{4}$ in., glabrous, shining; petiole $\frac{1}{4}$ in. *Racemes* axillary twice the length of the petiole, rachis puberulous, peduncles subtended by a *bract* of about equal length. *Flower-bud* cylindric-clavate. *Flowers* $\frac{1}{4}$ in. *Calyx*-rim crenulate. *Petals* 5, oblong, many times longer than the calyx. *Fertile stamens* 3, shorter than the 5 bifid *staminodes*. *Ovary* ovoid. *Fruit* ovoid-oblong, obtuse.

5. **O. merguensis,** *Planch. in Herb. Kew;* arborescent, leaves oblong-lanceolate acuminate, base tapering, racemes many-flowered, peduncles ascending scarcely exceeding the bracts.

TENASSERIM; at Mergui, *Griffith;* MALACCA, *Maingay*.

A low tree. *Branches* purplish, glabrous. *Leaves* 5 by $1\frac{1}{2}$ in., glabrous, coriaceous; petiole $\frac{1}{8}$ in. *Racemes* solitary or many from the same axil, rather longer than the petiole, simple or branched, erect; peduncles puberulous. *Bracts* ovate, acute, concave, overlapping when young. *Flowers* $\frac{1}{3}$ in., whitish, fragrant. *Petals* usually 6, in 3 pairs, or 5, rarely three. *Fertile stamens* 3, opposite the petals, nearly as long as the bifid staminodes. *Ovary* ovoid-conic.

6. **O. acuminata,** *Wall. Cat.* 6781; shrubby, branchlets angular, leaves ovate or oblong-lanceolate acuminate, racemes few-flowered, peduncles deflexed. *Benth. in Linn. Trans.* xviii. 678. O. Heyneana, *Wall. Cat.* 6780. O. longifolia, *Wall. Cat.* 6782.

SILHET, *Wallich;* Khasia Mts., alt. 2000 ft., *H.f. & T.;* BHOTAN, *Griffith;* ASSAM, *Jenkins*.

A scandent? shrub. *Branches* glabrous, yellow, divaricate, virgate. *Leaves* 2–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., glabrous, acute, base tapering; petiole $\frac{1}{8}$ in. *Racemes* very short, peduncles distichous. *Flower-buds* ovoid-conic. *Flowers* minute. *Calyx* pateriform. *Petals* 3, oblong-lanceolate, apex incurved. *Fertile stamens* 3, opposite the petals, shorter than the 6 bifid staminodes; anthers apiculate. *Ovary* ovoid. *Fruit* $\frac{3}{4}$ in., ovoid-oblong, obtuse, glabrous, orange-coloured.

7. **O. nana,** *Wall. Cat.* 6783 A, B; suffruticose, leaves oblong-lanceolate, peduncles solitary 1-flowered. *Benth. in Linn. Trans* xviii. 678.

Hot Valleys of the WESTERN HIMALAYA, ascending to 5000 ft. from Nipal westward and in the PANJAB.

Shoots herbaceous, from a contracted woody stock, virgate. *Leaves* $1\frac{1}{4}$ by $\frac{1}{2}$ in., subsessile, glabrous, black in drying; petiole $\frac{1}{8}$ in. *Flower-buds* obovoid. *Flowers* scarcely $\frac{1}{2}$ in. *Petals* 3, oblong-lanceolate, rather obtuse. *Fertile stamens* 3, opposite to the petals. *Staminodes* bifid, longer than the fertile stamens. *Ovary* ovoid-oblong, 1-celled. *Fruit* globular, pea-like, 1-celled, 1-seeded.—This is one of those curious plants, which like *Grewia nana*, appear never to form a trunk, but only a contracted stock from which the shoots originate every year and are destroyed by fire, cattle, &c.

3. OCHANOSTACHYS, Mast.

A tree or shrub. *Leaves* alternate, petiolate, 1-nerved. *Flowers* numerous, on long, slender, branching axillary spikes. *Calyx* cup-shaped, 4–5-toothed, not accrescent? *Petals* 4–5, free, valvate, hairy within. *Stamens* 12–15, hypogynous, or adherent to the base of the petals, or arranged in groups of 3 before the petals, filaments subulate, glabrous; anthers minute, didymous, opening longitudinally. *Staminodes* 0. *Disk* hypogynous, fleshy, very shallow, annular, or inconspicuous. *Ovary* free, ovoid, incompletely 3-celled beneath, 1-celled above; style cylindric, stigma minute capitate obscurely 3-lobed; ovules 1 in each cell, pendulous from the apex of a central placenta. *Fruit* unknown.—DISTRIB. Species 1 or 2 natives of the Malay peninsula and Borneo. In technical characters allied to *Ximenia*, but differing in habit, arrangement of the leaves, inflorescence and number of stamens. The name refers to the thong-like inflorescence.

1. **O. amentacea,** *Mast.*; leaves oblong acuminate, base acute, spikes about as long as the leaves.

MALACCA, *Maingay, Griffith.*—DISTRIB. Borneo.

Branches terete. *Leaves* 5–6 by 2½ in., coriaceous, glabrous, quite entire, 1-nerved, secondary pairs of nerves about 5, rather distant, arching; petiole ½ in. *Flower-bud* roundish-oblong. *Flowers* ⅒ in. *Calyx* puberulous. *Stamens* ⅓ shorter than the petals.

4. CTENOLOPHON, Oliv.

Trees. *Leaves* opposite, petiolate, simple, 1-nerved. *Inflorescence* panicled-cymose, terminal. *Flowers* regular, hermaphrodite, dichlamydeous. *Calyx* 5-parted; lobes imbricate, not accrescent. *Petals* 5, free, imbricate, oblong, reflexed after flowering. *Stamens* 10, free, springing from a short, ring-like hypogynous disk, those opposite the petals longer than the others; anthers roundish, apiculate, 2-celled, dehiscing lengthwise. *Staminodes* 0. *Ovary* free, shortly stalked, imperfectly 2-celled; style cylindric, apex bifid, stigmas capitate; ovules in pairs in each cell, collateral, pendulous. *Fruit* coriaceous or crustaceous, 1-celled, 1-seeded, dehiscing irregularly. *Seed* pendulous from the apex of a free central placenta, and provided with a dorsal, pectinate crest.—DISTRIB. 2 known species, both Malayan.

1. **C. parvifolius,** *Oliv. in Trans. Linn. Soc.* xxviii. 516, t. 43; leaves elliptic shortly and obtusely acuminate, ovarian cavity reaching nearly to the base of the style.

MALACCA, *Maingay.*

Branchlets glabrous, purplish. *Leaves* 2–4½ by 1¼–1¾ in., coriaceous, glabrous, shining above, reticulate beneath, base rounded; petiole ⅓–½ in., channelled. *Inflorescence* about the length of the leaves, cano-tomentose, panicled-cymose; pedicels short, thick. *Bracts* $\frac{1}{12}$ in., caducous, ovate, deltoid. *Flowers* ⅓ in. *Calyx-lobes* roundish, concave, tomentose outside, subglabrous within. *Petals* 5, erect, four times longer than the calyx-lobes, coriaceous, oblong, recurved, downy outside, except at the overlapped margin. *Anthers* adnate. *Ovary* ovoid-globose, hirsute, surrounded at the base by an annular disk, 2-celled; style elongate, 2-furrowed, glabrous. *Fruit* ½–¾ in., ellipsoid; pericarp woody, crustaceous, splitting on one side. *Seeds* with an arilloid crest.

2. **C. grandifolius,** *Oliv. l.c.*; leaves oblong shortly and obtusely acuminate, ovarian cavity scarcely exceeding in length the hypogynous disk.

MALACCA, *Maingay.*

Branchlets terete, glabrous. *Leaves* 3½–7 by 1½–2½ in., coriaceous, glabrous, entire, midrib prominent beneath; petiole ⅓–½ in., glabrous or pruinose. *Inflorescence* subpyramidal, peduncles ascending, articulate at the nodes, pedicels exceeding the calyx. *Bracts* scale-like, caducous. *Flowers* ¼–⅓ in. *Sepals* equal, roundish, concave, coriaceous, cano-tomentose outside, glabrous within. *Petals* 5–6 times longer than the sepals, linear-oblong, cano-tomentose. *Pollen-grains* large, 5–6-gonous, compressed. *Ovary* ovoid, densely hirsute, angular, 2-celled, dissepiment perforate; style short, glabrous above. *Fruit* not seen.

5. **ERYTHROPALUM,** Blume.

Climbing cirhose shrubs. *Leaves* alternate, petiolate, simple, palminerved. *Tendrils* axillary. *Peduncles* axillary, dichotomous, ultimate pedicels umbellate, ebracteate. *Flowers* hermaphrodite (monœcious *Blume*). *Calyx* adherent, limb 4–5-parted. *Corolla* rotate-campanulate, deeply 5-lobed, lobes valvate. *Stamens* 5, opposite the petals, filaments very short; anthers incurved, adnate, introrse, 2-celled, dehiscing lengthwise at the sides; connective thick. *Staminodes* 5, alternate with the lobes of the calyx, and springing with the stamens from the throat of the corolla. *Ovary* semi-adherent, obconic, tapering at the apex into a short style, 1-celled, sometimes (always?) provided with an epigynous disk; stigma minute 3-lobed; ovules 1–3, pendulous from the apex of the ovarian cavity, naked. *Fruit* fleshy, indehiscent, ovoid-oblong or clavate, surmounted by the remains of the calyx, 1-celled; epicarp (calyx?) ultimately separating from the fruit in 3–5 fleshy, reflexed valves. *Seed* 1, pendulous, albumen fleshy; embryo minute.—Distrib. The following are the only known species:—

1. **E. scandens,** *Blume Bijdr.* 921; leaves glabrous membranous ovate or oblong-lanceolate acuminate, base subpeltate rounded or acute, flowers less than $\frac{1}{12}$ in. *Miq. Fl. Ind. Bat.* i. pt. i. 704; *Wall. Cat.* 9033, without name. Cocculus calophyllus, *Wall. Mss. in herb.*

Silhet, *Wallich*; Khasia Mts., alt. 2–2400 ft., *H. f. & T.*; Pegu, *Kurz*; Malacca, *Maingay*.—Distrib. Java.

Branches striated, glabrous. *Leaves* 5 by $2\frac{3}{4}$ in., 3–7-nerved, glaucous beneath. *Tendrils* (abortive peduncles) simple or bifid, thickened towards the apex. *Cymes* axillary, lax, much branched, many-flowered, peduncles 3–4 in.; branches divaricate, ultimate pedicels umbellate, longer than the flower. *Bracteoles* minute. *Calyx* cup-shaped, obscurely 4–5-toothed. *Corolla* deeply 5-parted, lobes ovate. *Ovary* ovoid, style short. *Fruit* $\frac{3}{4}$–1 in. by $\frac{1}{2}$ in., 1-celled, epicarp, (persistent calyx), yellowish, ultimately separating from above downwards into 3–4 valves.

2. **E. populifolium,** *Mast.*; leaves subcoriaceous ovate or roundish acuminate, base cordate subpeltate, flowers exceeding $\frac{1}{12}$ in. Mackaya populifolia, *Arn. in Mag. Zool. Bot.* 1838, ii. 531.

Travancor, at Courtallum, *Wight*.

Glabrous. *Leaves* 5 by $4\frac{3}{4}$ in., 3–7-nerved, glaucous beneath; petiole $1\frac{1}{2}$ in. *Peduncles* axillary, 1 or more together, or on a short thick spur, slender, dichotomous, few-flowered, pedicels longer than the flowers. *Calyx* cup-shaped, obscurely 5-toothed. *Corolla* rotate, deeply 5-parted, lobes oblong, much longer than the calyx. *Ovary* ovoid, semi-adherent, 1-celled; style short, subulate; ovules 3. *Fruit* $\frac{3}{4}$ in., oblong or ellipsoid.

3. **E. vagum,** *Mast.*; leaves subcoriaceous ovate-oblong obtuse or acute, base subpeltate cordate, ovary with an epigynous disk. Modeccopsis vaga, *Griff. Notul.* iv. 633; *Ic. Pl. Ind. Or.* 628.

Tropical Himalaya, from Nipal to Mishmi and Assam; Malacca, *Griffith*.

Leaves $6\frac{1}{2}$ by $4\frac{1}{2}$ in., 5–7-nerved; petiole 2 in. *Peduncle* 7–8 in. *Calyx-tube* obconic, margin obscurely 5-toothed. *Corolla* deeply 5-lobed; lobes herbaceous, oblong-ovate, reflexed. *Filaments* filiform, anthers minute. *Ovary* ovoid-oblong, 1-celled, epigynous disk large, 5-lobed, lobes opposite the sepals; style short, subulate, stigma minute ovules 3, pendulous, anatropal. *Fruit* 1 in., ovoid-oblong, surmounted by the remains of the disk, epicarp fleshy whitish; mesocarp somewhat bony, brownish; endocarp whitish, spongy. *Seed* solitary, large, pendulous, ovoid, acute below, without coat or distinction of parts except a trace of a radicle (Griffith).—The structure of the seed requires further investigation. Materials are wanting for this purpose.

6. **STROMBOSIA,** Blume.

Trees or shrubs. *Leaves* alternate, petioled, simple, 1-nerved. *Inflorescence* cymose, cymes short. *Flowers* regular, hermaphrodite, dichlamydeous. *Calyx* cup-shaped, more or less 5-lobed, inferior, or partly superior. *Petals* 5, free, hairy within. *Stamens* 5, opposite the petals and adnate to their base; anthers 2-celled, introrse. *Staminodes* 0. *Ovary* wholly superior, or partly inferior, imperfectly 4–5-celled, surrounded by a perigynous 5-lobed disk; style simple; ovules 4–5, pendulous from a central placenta. *Fruit* drupaceous, surmounted by the remains of the calyx-lobes and of the style; stone crustaceous. *Seed* pendulous, embryo minute within fleshy albumen. —DISTRIB. Species 6, natives of the Western peninsula, Ceylon and the Archipelago. In the Indian species I find the flowers cleistogamous.

SECT. 1. **Eustrombosia.** *Ovary* free.

1. **S. javanica,** *Blume Bijdr.* 1154; *Mus. Bot. Lugd. Bat.* i. 251 c. *ic.*; leaves oblong acuminate entire, base rounded, calyx obscurely 5-lobed. *Miq. Fl. Ind. Bat.* i. 787.

EASTERN PENINSULA; TENASSERIM, *Helfer*; Penang, *Wallich*; Malacca, *Maingay*.

A lofty tree with hard white wood. *Branches* terete, purplish, glabrous. *Leaves* 6–7 by 3 in., coriaceous, glabrous; petiole ½–¾ in. *Flower-bud* ellipsoid. *Flowers* $\frac{1}{6}$–¼ in., greenish, in short axillary cymes, which scarcely exceed the petiole. *Calyx* shallow, free, but accrescent and adherent to the fruit. *Petals* 5, much exceeding the sepals, oblong, coriaceous, slightly hairy within near the revolute tip. *Stamens* 5, ⅓ shorter than the petals. *Ovary* conical, style short. *Fruit* drupaceous, turbinate, substipitate, by abortion 1-seeded.—Although the ovary of this species is free, the fruit is adherent (Blume confirmed by Baillon).

SECT. 2. **Lavallea** (*Baillon*, genus). *Ovary* more or less adherent to the calyx-tube.

2. **S. ceylanica,** *Gardn. in Calc. Journ. Nat. Hist.* vi. 350; leaves inequilateral oblong-lanceolate acuminate entire, calyx 5-fid. *Miq. Fl. Ind. Bat.* i. pt. i. 787; *Bedd. Fl. Sylv.* t. 137. Strombosia javanica, *Thwaites Enum.* 42, *not of Blume.* Sphærocarya leprosa, *Dalz. in Hook. Kew Journ.* iii. 34; *Dalz. & Gibs. Bomb. Fl.* 223. Lavallea ceylanica, *Baill. Adansonia*, ii. 361.

WESTERN PENINSULA; in the Concan and Canara. CEYLON, in forests of the Central province, alt. 3000 ft.

A tree or shrub with greyish bark. *Leaves* 6 by 2¼ in., glabrous, coriaceous, base rounded or somewhat tapering; petiole ½ in. *Flower-buds* oblong-clavate. *Flowers* $\frac{1}{12}$–$\frac{1}{10}$ in., subsessile, in axillary glomerules, or on a thick spur. *Calyx-lobes* rounded, ciliate. *Petals* 3 times longer than the calyx-lobes, acute, hairy within, tips ultimately reflexed. *Ovary* 4–5-celled below, ovules 5. *Fruit* 1 in., pyriform, rugose, deep purple, apiculate, scaly, tuberculate when ripe.—The species varies in stature and in the form of the leaf. The Cingalese forms have often more oblique leaves than those from the Peninsula.

7. ANACOLOSA, Blume.

Shrubs or trees. *Leaves* alternate, petiolate, simple, 1-nerved. *Inflorescence* cymose, axillary. *Calyx* cup-shaped, 5–7-toothed, not accrescent. *Petals* 5–7, free, valvate, springing with the stamens from an hypogynous or perigynous disk. *Stamens* concealed in the cavity of the petals and slightly adnate to their base, filaments glabrous, or pilose at the apex; anthers basifixed, 2-celled, dehiscing longitudinally. *Ovary* imperfectly 2–3-celled below, 1-celled above; style simple, stigma shortly lobed; ovules 2–3, pendulous from a central placenta. *Fruit* drupaceous, surrounded by the accrescent disk; stone crustaceous, 1-seeded. *Seed* pendulous; embryo minute, at the apex of fleshy albumen, radicle superior thicker than the cotyledons.—DISTRIB. Species 5 or 6, natives of Southern India, the Malay peninsula, and archipelago.

1. **A. densiflora,** *Bedd. in Trans. Linn. Soc.* xxv. 211, t. 22; *Fl. Sylv.* t. 138; leaves oblong acuminate, base rounded, cymes many-flowered dense, calyx glabrous.

TRAVANCOR, on the Anamallay hills, *Beddome.*

A lofty tree. *Branches* terete. *Leaves* 4–5 by 1½–2 in., glabrous, shining, entire; petiole ¼ in. *Cyme* 7–20-flowered, pedicels ¼ in., as long as the yellow fragrant flowers. *Flower-buds* ovoid, conic. *Calyx* cup-shaped, 4–6-toothed. *Petals* 4–6, ovate-lanceolate, reflexed at the tips, hispid within. *Filaments* glabrous, much shorter than the petals, anthers roundish glabrous. *Ovary* surrounded by a broad disk, 3-celled, cells 1-ovulate; style simple, scarcely so long as the ovary, stigma 3-lobed.

2. **A. ilicoides,** *Mast.*; leaves oblong-lanceolate acute at both ends, cymes few-flowered lax, calyx glabrous.

KHASIA MTS., *J. D. H. & T. T.*

A small spreading tree. *Bark* grey. *Leaves* 5–6 by 2 in., glabrous, coriaceous; petiole ½–¾ in. *Peduncle* half the length of the petiole, dividing into 3 pedicels as long as itself, or cymes sessile, umbellate. *Flower-buds* ovoid, subglobose. *Calyx* glabrous, cup-shaped, 5–6-fid, lobes deltoid. *Petals* 5–6, 2 or 3 times longer than the sepals, coriaceous, oblong, inflexed at the points, hairy within just above the anther. *Filaments* broad, glabrous; anthers subglobose. *Ovary* depressed conic, imperfectly 3-celled; ovules 3. *Fruit* unknown.

3. **A. Griffithii,** *Mast.*; leaves lanceolate or ovate-lanceolate, cymes few-flowered, calyx glabrous.

TENASSERIM and ANDAMAN ISLANDS, *Griffith, Kurz.*

Shrub or tree? *Branches* slender, purplish. *Leaves* 2½ by 1 in., coriaceous, glabrous; petiole ½ in. *Cymes* axillary, sessile, or on a short scaly spur; pedicels half the length of the petiole. *Flower-buds* subglobose. *Calyx* cup-shaped, 5–6-toothed. *Petals* 2 or 3 times longer than the sepals. *Filaments* much shorter than the petals. *Ovary* conical, 2–3-celled; style short, stigma obscurely lobed; ovules 2–3.

4. **A. Maingayi,** *Mast.*; leaves suborbicular, base rounded, cymes few-flowered, calyx glabrous.

SINCAPORE, *Maingay.*

A tree or shrub? *Bark* grey, rugose, tubercled. *Leaves* about 2 in. each way, coriaceous, glabrous, venation obscure; petiole ½ in. *Cymes* axillary; pedicels glabrous, shorter than the petiole, each with 2–3 minute, squamiform bracts at the base. *Flower-buds* oblong. *Calyx* cup-shaped, minutely 5-toothed. *Petals* 5, oblong, valvate. *Filaments* glabrous, much shorter than the petals; anthers oblong. *Ovary* surrounded by a 5-lobed disk, imperfectly 3-celled; style as long as the ovary, stigma 3-lobed ovules 3, pendulous. *Fruit* the size of a pea, glaucous, globose.

5. **A. puberula,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 297; leaves oblong or ovate-oblong acuminate, base acute, calyx puberulous.

ANDAMAN ISLDS., *Kurz.*

A large shrub. *Leaves* 5–6 in., shortly petioled, glabrous, coriaceous. *Peduncles* short, erect, puberulous, springing from a short, thick, axillary spur. *Calyx* covered with yellowish down (Kurz).—I have nôt seen this species.

6. **A. ? heptandra,** *Maingay in herb.*; leaves lanceolate, base acute, calyx puberulous, filaments hairy.

MALACCA, *Maingay.*

A shrub or tree. *Leaves* 6 by 2 in., coriaceous, glabrous; petiole $\frac{1}{4}$ in. *Peduncles* 4–6, axillary, tufted, about the length of the petiole, puberulous. *Flower-buds* oblong-truncate. *Flower* $\frac{1}{12}$ in. *Calyx* cup-shaped, 5-toothed. *Petals* 5 (7, Maingay), valvate, coherent, ultimately free, coriaceous, oblong, obtuse, concave, triangular at the apex, hairy on the middle of the inner surface, edges membranous. *Stamens* 5 (7, Maingay), hypogynous, opposite the petals, filaments broadly strap-shaped, bilobed at the apex, and provided with a tuft of bristly hairs; anthers minute, didymous, concealed by the hairs of the filament; pollen-grains triangular. *Ovary* depressed-globose, lobed, surrounded by an annular disk, imperfectly 2–3-celled; style conic-fusiform as long as the ovary, stigma minutely 2–3-toothed; ovules 2–3, pendulous.—A remarkable species. The flowers I examined were pentamerous. Maingay says in a note that it agrees with *Anacolosa* in all respects but the heptamerous flowers.

8. **SCHŒPFIA,** Schreb.

Trees. *Branches* terete or angular. *Leaves* alternate, simple, petiolate. *Racemes* axillary, many-flowered. *Flowers* fragrant, yellow. *Epicalyx* cup-shaped, deeply 3-lobed. *Calyx* adherent to the ovary, limb obsolete. *Corolla* perigynous, tubular, limb 4–5-parted. *Stamens* 4–5, epipetalous, filaments slender; anthers free, glabrous, 2-celled, attached below the middle to the apex of the filament; pollen triangular. *Ovary* half-superior, surmounted by a fleshy epigynous disk, 3-celled beneath, 1-celled at the top; style cylindric, stigma capitate, 3-lobed; ovules 3, cylindric, pendulous from the apex of a central placenta. *Fruit* drupaceous, surrounded at the base by the persistent epicalyx, marked above by the remains of the calyx and corolla; stone thin, striated, 1-celled, 1-seeded. *Embryo* minute, in the apex of fleshy albumen, radicle superior, cotyledons plano-convex.—DISTRIB. Species 3–4, natives of the Himalaya and of tropical South America.

1. **S. fragrans,** *Wall. Tent. Fl. Nep.* 18, t. 9; leaves narrow lanceolate acuminate. *Roxb. Fl. Ind.* ii. 188; *Griff. Ic. Pl. Ind. Or.* 629. S. odorata, *Wall. Cat.* 485.

NIPAL, *Wallich.* KHASIA MTS., *Griffith.*

A small tree. *Bark* corky, whitish. *Branches* terete, smooth. *Leaves* scattered, 2–3 by $\frac{1}{2}$–$\frac{3}{4}$ in., acute at both ends; petiole $\frac{1}{4}$ in., channelled above. *Racemes* half the length of the leaves; rachis slender, pedicels 6–8, each $\frac{1}{2}$–1 in. *Flowers* $\frac{1}{4}$ in. *Lobes of the epicalyx* imbricate, ciliate. *Corolla* double the length of the calyx-tube, tubular or funnel-shaped, limb 5-lobed; lobes lanceolate, acute, valvate, with a tuft of hairs on the centre of the inner surface. *Filaments* attached to the petals for nearly their whole length; anthers on a level with the hairs on the petals, connective prolonged above. *Ovary* nearly twice the length of the calyx.—The plant varies considerably in the size of the leaves and flowers. I have followed Wallich's description of the epicalyx, the three bracts of which differ from the calyx of *Anacolosa* and *Cathedra* (with which they are compared by Bentham) in their unequal size and their imbrication.

2. **S. acuminata,** *Wall. Cat.* 486; leaves oblong-lanceolate acute, flowers ½ in.

Silhet and the Khasia Mts., *Wallich*, &c.; Mishmi Hills, *Griffith.*

A tree. Young *branches* angular. *Leaves* 6 by 1¾–2 in., glabrous, very acute at the apex, less so at the base; petiole ⅛ in. *Pedicels* ¼ in. *Epicalyx* cup-shaped, scarcely lobed. *Corolla* ½ in., yellow, fragrant, tubular-campanulate, limb 5-lobed; lobes valvate, ovate-acute, hairy within. *Stamens* and *ovary* as in *S. fragrans.*—This differs from *S. fragrans* in its broader leaves, shorter pedicels, and much larger flowers.

In the herbarium are specimens from Griffith collected in Bhotan (n. 1819), which are very imperfect, but which apparently belong to a third species of *Schœpfia*, characterized by short ovate or oblong-acute leaves, with closer venation than in *S. fragrans* or *S. acuminata.*

9. CANSJERA, Juss.

Climbing shrubs, sometimes spiny. *Leaves* alternate, shortly petioled, 1-nerved. *Flowers* bracteate, in dense axillary spikes, monochlamydeous, hermaphrodite. *Perianth* regular, 4–5-parted, lobes valvate. *Fertile stamens* as many as the lobes of the perianth, and opposite to them, filaments glabrous, free, or adnate at the base to a thickened disk; anthers small, oblong, adnate, 2-celled, dehiscing longitudinally. *Staminodes* (glands of disk) 4–5, hypogynous, alternate with the stamens, ovoid or subtriangular, fleshy. *Ovary* superior, ovoid-conical, 1-celled; style cylindric, stigma capitate 4-lobed, lobes alternating with the fertile stamens; ovule solitary, pendulous. *Fruit* drupaceous, surrounded at the base by the marcescent perianth; stone bony. *Seed* solitary, erect, roundish; embryo in the upper part of the fleshy albumen, radicle superior, cotyledons sometimes 3 very long plano-convex.—Distrib. Species 3–4, natives of Tropical Asia and Australia.

In the description of the ovary and seed I have followed Griffith, as my observations coincide with his. Bentham finds a true calyx, which others have not been able to see, nor have I been able to detect one. Miers says the ovary is 4-celled at the base, but I have only seen it 1-celled, as Bentham describes it. Many authors, including Meissner and Miers, place this genus in *Thymelaceæ*, an arrangement I myself prefer, but in default of more certainty as to the real structure of the flower, the genus is here retained in *Olacineæ.*

1. **C. Rheedii,** *Gmel. Syst.* i. 280; leaves glabrous ovate or oblong-lanceolate, spikes axillary solitary or twin. *Wall. Cat.* 1043, B; *Wight Ic.* t. 1861; *Bedd. Flor. Sylvat. Anal. Gen.* t. xxvi.; *Thwaites Enum.* 251; *Brandis. For. Flor.* 75. C. scandens, *Roxb. Cor. Pl.* 103; *Fl. Ind.* i. 441. C. malabarica, *Lamk. Dict.* iii. 433. C. zizyphifolia, *Griff. Notul.* iv. 360, t. 537, f. 1. C. martabanica, *Wall. Cat.* 7266. Salvadora persica, *Wall. Cat.* 1042, *not of Linn.* Olax? sumatrana, *Miq. Fl. Ind. Bat. Suppl.* i. 342. Opilia amentacea, *Wall. Cat.* 2331. Struthiola scandens, *Wall. Cat.* 2331.—*Rheede Hort. Mal.* vii. t. 2, 4.

Upper Gangetic plain, in forests of Oude; Western Peninsula, from the Concan and Dekkan southwards. Eastern Peninsula, in Martaban and Malacca.—Distrib. Indian Archipelago, Hong Kong, N. Australia.

A climbing evergreen shrub. *Branches* divaricate sometimes spiny, younger ones, as well as the inflorescence petioles and tube of flower, pubescent. *Leaves* 1½–3 by ¾–1½ in., coriaceous, yellowish and rugose when dry, base rounded, sometimes oblique; nerves depressed, arching, evanescent towards the apex; petiole $\frac{1}{12}$–⅙ in. *Spikes* about 1 in., dense, many-flowered. *Bracts* minute. *Flowers* yellow. *Perianth* $\frac{1}{12}$–⅛ in., urceolate, limb 4–5-parted. *Fruit* ½–¾ in., ellipsoid or ovoid, orange-red, surmounted by the remains of the style.

2. **C. parvifolia,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 298; leaves pubescent and pilose rounded or ovate acute.

TENASSERIM, *Helfer.*

A shrubby climber? *Shoots*, leaves and inflorescence pubescent and with stiff forked hairs. *Leaves* $\frac{3}{4}$ by $\frac{2}{3}$ in., coriaceous, base rounded; petiole very short. *Bracts* ovate, acute. *Perianth* $\frac{1}{12}$ in., funnel-shaped or urceolate, limb 4-parted; lobes ovate, ultimately spreading. *Stamens* 4, free, springing from a perigynous disk, opposite the lobes of the perianth; anthers small, introrse. *Glands of disk* (staminodes) ovoid, acute, fleshy. *Ovary* oblong.

10. **LEPIONURUS,** Blume.

Arborescent. *Leaves* alternate, shortly petioled, simple, 1-nerved. *Inflorescence* axillary, of numerous densely packed trichotomous umbellate cymes, each subtended by an ovate bract. *Flowers* monochlamydeous, regular, hermaphrodite. *Perianth* urceolate, limb 4-parted; lobes valvate, glabrous within. *Stamens* equal in number to the lobes of the perianth and opposite to them; anthers glabrous. *Staminodes* 0. *Disk* fleshy, yellow, lining the base of the perianth-tube. *Ovary* free, oblong, conical; stigma sessile 4-lobed; ovule solitary. *Fruit* drupaceous, glabrous, stone crustaceous. *Seed* pendulous; embryo small, in the axis of fleshy albumen, radicle terete, cotyledons ternate.—DISTRIB. Species 2, natives of Tropical Asia.

1. **L. oblongifolius,** *Mast.;* leaves oblong or obovate-lanceolate acuminate. Leptonium oblongifolium, *Griff. in Calc. Journ. Nat. Hist.* iv. 236. Opilia acuminata, *Wall. Cat.* 7206 F.

EASTERN BENGAL, ASSAM, and the KHASIA MTS., ascending to 2000 ft. ABOR HILLS, *Griffith;* TENASSERIM at Mergui, *Griffith.* MALACCA, *Maingay.*—DISTRIB. Java, Sumatra.

Branches greenish, subangular, glabrous. *Leaves* 5–7 by $1\frac{3}{4}$–$2\frac{3}{4}$ in., membranous, glabrous, base acute; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Pedicels* twice the length of the petiole. *Bracts* thin, membranous, roundish, imbricating when young. *Flowers* minute. *Fruit* $\frac{1}{2}$ by $\frac{1}{4}$ in.—The flowers are minute and the specimens very imperfect, hence the flowers are differently described by different authors. In the absence of more complete material, it is not possible to decide which view is the more correct. In the generic description I have followed Griffith, as the results of my own examinations, so far as they have gone, are in accordance with his. Wallich's 7464 A may possibly also belong to this genus, but the material is too scanty for accurate determination. Its flowers are in axillary spikes, and have a monochlamydeous, 5-parted, campanulate perianth, isomerous stamens opposite the lobes, 2-celled anthers dehiscing longitudinally and a free roundish ovary.

11. **OPILIA,** Roxb.

Scandent shrubs or low trees. *Leaves* alternate, distichous, simple, entire, 1-nerved, shortly petioled. *Flowers* numerous, in axillary, racemose cymes, each cyme umbellate. *Bracts* deciduous. *Calyx* minute, annular, obscurely 5-toothed, not accrescent. *Petals* 5. *Fertile stamens* 5, free, opposite the petals; anthers 2-celled, dehiscing longitudinally. *Glands of the disk* (staminodes) alternating with the petals, thick, fleshy. *Ovary* free, sessile, 1-celled; style short, stigma minute; ovule solitary, pendulous. *Fruit* drupaceous. *Seed* albuminous; radicle superior.—DISTRIB. Species 1 or 2 natives of the tropics of the Old World.

1. **O. amentacea,** *Roxb. Cor. Pl.* ii. t. 158; *Fl. Ind.* ii. 87; leaves ovate or ovate-lanceolate. *Wight Ill.* t. 40; *Thwaites Enum.* 41; *Miq. Fl. Ind.*

Bat. i. pt. i. 784; *Bedd. Fl. Sylv. Anal. Gen.* t. ix. f. 3. O. javanica, *Miq. Fl. Ind. Bat.* i. pt. i. 174. Ximenia ? olacoides, *W. & A. Prodr.* i. 89.

Western Peninsula; Northern Circars, *Roxburgh;* Pulney Mts., *Wight;* Pegu, *Kurz;* Ceylon, in hot dry parts of the island, *Thwaites.*—Distrib. Islands of the Archipelago, tropical Australia and Africa.

A low scrambling shrub, or small weak tree; herbaceous portions puberulous. *Leaves* 2–4 by $1\frac{1}{2}$–2 in., coriaceous, glabrous, ovate, or ovate-lanceolate, entire, 1-nerved, arch-nerved, base tapering; petiole $\frac{1}{4}$–$\frac{1}{2}$ in. *Racemes* 1–$1\frac{1}{2}$ in., erect, before flowering resembling cones. *Flowers* crowded. *Bracts* imbricate, at first concealing the flowers, peltate, roundish, deciduous. *Pedicels* $\frac{1}{12}$ in., puberulous. *Flowers* $\frac{1}{2}$ in. *Calyx* minute. *Petals* 5, deciduous, each $\frac{1}{12}$ in., oblong, obtuse, alternating with the lobes of the calyx. *Glands* (staminodes?) oblong, obtuse, half the length of the stamens. *Drupe* ovoid or globose. *Embryo* linear nearly as long as the albumen.—Beddome describes the ovule as erect, but this is probably an oversight.

12. **LASIANTHERA,** Pal. de Beauv.

Shrubs or trees, sometimes scandent. *Leaves* petioled, alternate, simple, 1-nerved, coriaceous. *Cymes* axillary, stalked. *Flowers* dichlamydeous, hermaphrodite or unisexual. *Calyx* minute, cup-shaped, 4–5-lobed. *Petals* 4–5, free or rarely cohering, without an inflexed point and with no prominent midrib. *Stamens* 5, hypogynous, free, alternate with the petals, filaments flat, dilated above, hairy behind, hairs curving over the anther in the bud; anthers adnate, 2-lobed, dehiscing lengthwise. *Hypogynous disk* cup-shaped, more or less lobed. *Ovary* ovoid, 1-celled, tapering into a subulate style, terminated by a minute stigma; ovules 2, pendulous. *Fruit* drupaceous; stone fibrous outside, woody within. *Seed* pendulous; embryo in albumen, cotyledons leafy broad, radicle superior (Thwaites).—Distrib. Species 4–5, 1 African, the others Malayan.

1. **L. apicalis,** *Thwaites Enum.* 43 and 403; leaves obovate-oblong shortly and abruptly acuminate, petals free or nearly so, fruit ellipsoid. *Bedd. Fl. Sylv.* t. 139. Urandra apicalis, *Thwaites in Hook. Kew Journ.* vii. 211. Stemonurus apicalis, *Miers in Trans. Linn. Soc.* xxii. 110; *Contrib.* i. 305. ? S. secundiflorus, *Blume Bijdr.* 649. Lasianthera secundiflora, *Miq. Fl. Ind. Bat. Suppl.* i. t. ii.

Ceylon; in damp forests, alt. 1–3000 ft., *Thwaites.*—Distrib. Borneo.

A large tree. *Branches* terete, glabrous. *Leaves* 4–6 by 2–3 in., coriaceous, glabrous, midrib depressed above, prominent beneath, base tapering into a short petiole, $\frac{1}{4}$–$\frac{1}{2}$ in. *Peduncles* about as long as the petiole, axillary, subsolitary, cymes congested 7–12 fl. *Flowers* greenish-purple. *Calyx* cup-shaped, 5-lobed, lobes roundish. *Petals* 3 or 4 times longer than the calyx, ovate or roundish. *Stamens* as long as or longer than the petals. *Ovary* ovoid, surrounded by an hypogynous cupular lobulate disk, tapering above into a subulate style, stigma minute. *Drupe* $1\frac{1}{4}$ by $\frac{3}{4}$ in., stone woody lacunose, mesocarp fibrous. *Testa* consolidated with the pericarp. *Embryo* half the size of the albumen; cotyledons leafy, cordate-ovate, acute, as long as the superior radicle. (Thwaites.)

2. **L. malaccensis,** *Mast.;* leaves oblong-lanceolate abruptly acuminate, calyx puberulous, petals coherent.

Malacca, *Maingay.*

A scandent shrub (Maingay). *Leaves* $4\frac{1}{2}$–$5\frac{1}{2}$ by 2 in., coriaceous, glabrous, midrib prominent, secondary nerves obscure; petiole scarcely $\frac{1}{2}$ in. *Cymes* axillary, stalked; peduncle compressed, as long as the petiole; pedicels shorter than the flowers, ascending. *Flowers* $\frac{1}{4}$ in. *Calyx* shallow, lobes deltoid acute. *Petals* 4–5 times longer than the calyx, slightly coherent, externally glabrous, linear, spotted within. *Filaments* flat, dilated above, slightly hairy in front beneath the anther, densely so behind. *Hypogynous disk* cup-shaped, more or less 5-lobed, lobes opposite the petals. *Ovary* half the length of the stamens, ovoid, rugulose; style conic, stigma minute. *Fruit* unknown.

3. **L. Maingayi,** *Mast.;* leaves ovate or ovate-lanceolate acute or subacuminate, base acute, fruit small ovoid obtuse.

Malacca, *Maingay.*

A shrub about 4 ft. (Maingay). *Branches* virgate. *Leaves* 2–3 by ¾–1 in., coriaceous, glabrous; petiole ¼ in. *Peduncle* axillary, about the length of the petiole, dichotomous, ultimate pedicels drooping, shorter than the flowers. *Flowers* pendulous, ⅛ in. Male fl.: *Calyx* minute, cup-shaped, 4–5 toothed, teeth shallow acute. *Petals* 4–5, much exceeding the calyx, free, coriaceous, oblong-acuminate, (acumen inflexed,) glabrous on both surfaces or slightly pilose within, midrib prominent on the inner surface. *Stamens* 4–5, filaments flat, with a tuft of hairs at the back curving over the anther. *Pistil* rudimentary. Female fl.: *Fruit* ¼–½ in., 1-celled, 1-seeded.

4. **L.? lanceolata,** *Mast.;* leaves lanceolate pointed at both ends, cymes terminal, petals free villous internally.

Malacca, Mt. Ophir, *Griffith.*

Leaves 4–5 by ¾–1 in., glabrous; petiole ¼ in. *Cymes* terminal, half the length of the leaf; peduncle trichotomous; pedicels divaricate, densely tomentose, shorter than the flower. *Flower-buds* clavate. *Flowers* hermaphrodite. *Calyx* cup-shaped, 5-toothed. *Petals* 4–5, ultimately free, lanceolate, inflexed at the apex and marked with a prominent nerve. *Stamens* 4–5, filaments flat, shorter than the petals, pilose in front beneath the anther, densely so behind, hairs curling over the anther. *Ovary* ovoid, conical; style short, stigma minute.—This may be a form of some *Gomphandra.*

13. **GOMPHANDRA,** Wall.

Trees. *Leaves* alternate, petioled, simple, 1-nerved. *Cymes* axillary, terminal or opposite the leaves. *Flowers* dichlamydeous, hermaphrodite, or polygamo-diœcious. *Calyx* minute, cup-shaped, 4–5-lobed. *Corolla* campanulate, 4–5-lobed; lobes acuminate, inflexed, rarely entirely free, midrib prominent within. *Stamens* 5, hypogynous, alternate with the petals, filaments thick, dilated above, hairy at the back, hollowed in front to receive the anthers; anthers pendulous from the filiform apex of the filament, 2-lobed, dehiscing lengthwise; pollen-grains triangular. *Hypogynous disk* thick, annular or 0. *Ovary* effete in the male, oblong in the female flower, 1-celled; style conic, stigma minute or style crowned by a stigmatiferous disk; ovules 2, collateral, pendulous, funicle dilated into an "obturator." *Fruit* drupaceous, surmounted by the remains of the disk (stigma?), stone crustaceous. *Seed* pendulous, surrounded by the raphe, albumen fleshy bipartite; embryo minute.—Distrib. Species 5–6, natives of tropical Asia.

Owing to the frequently unisexual flowers and the imperfection of the materials, great confusion exists in books as to the characters and limitations of the genera *Gomphandra* and *Stemonurus.* This arises chiefly from the difficulty of determining and corelating the variations in the structure of the ovary. In some cases, in the male flowers, there is a rudimentary pistil with a subulate style; in other cases this is developed into a fertile ovuliferous ovary, the style retaining its conical shape. In a third series (the true female flowers) the ovary is oblong and is apparently surmounted by a fleshy discoid stigma. Miers, however, considers this stigma-like body to be in reality an accrescent epigynous disk concealing the true style and stigma. The exact relation of these forms one to the other, and their true nature cannot be surely determined from dried specimens. From *Lasianthera,* the most striking difference is the form of the hypogynous disk.

1. **G. axillaris,** *Wall. Cat.* 3718; leaves lanceolate, cymes axillary about the length of the petiole, flowers unisexual or polygamous. *Bedd. Fl. Sylv.* lxi. Lasianthera ? tetrandra, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 327. Platea axillaris, *Thwaites Enum.* 44; *Dalz. & Gibs. Bomb. Fl.* 28. Stemonurus axillaris, longifolius, Heyneanus, *and* ceylanicus, *Miers Contrib.* i. 90–93. S. polymorphus, *Miers* l.c. i. 87, *partly.* Olax Heyneana, *Wall. Cat.* 6780. O. longifolia, *Wall. Cat.* 6782, A *partly,* 6782 B. Gomphandra polymorpha, *Wight Ic.* 954, ♀ *partly.*—Diœcia pentandra, *Wall. Cat.* 6780 B.

Silhet, *Wallich;* Western Peninsula from the Concan southwards; Ceylon, from the sea level to 4000 ft., *Thwaites.*

A small tree or large shrub, glabrous, or the terete branches slightly puberulous. *Leaves* 2½–5½ by 1–2½ in., submembranous, conspicuously nerved, base acute; petiole ¼–½ in. *Cymes* puberulous. *Calyx* minute, 4–5-toothed, slightly ciliated. *Corolla* 4–5 times longer than the calyx, tubular-campanulate, limb 4–5-lobed; lobes ovate, acuminate, point inflexed, ultimately spreading. *Filaments* flat, pilose at the apex. *Ovary* small, oblong, smooth; style conic, stigma minute; disk accrescent. *Fruit* ½ in., oblong, obtuse, smooth, crowned by the remains of the stigma. *Seed* large, integument striated; cotyledons very large, semicylindric, amygdaloid, obtuse, radicle superior (Wallich). — Wallich describes the stigma as fleshy, broadish, subcapitate, but my own examination of Wallich's specimens agrees with that of Miers' description and figure. What Wallich took for the stigma may thus be the epigynous disk of which Miers elsewhere makes mention. The Silhet habitat is derived from Wallich's specimen of his number 6782. There is no other authority for this plant occurring in Eastern India.

2. **G. polymorpha,** *Wight Ill.* 103; *Ic.* 953 (not 954); leaves coriaceous roundish to lanceolate, base tapering, cymes terminal or opposite the leaves, very rarely axillary, two or three times longer than the petiole, flowers polygamous. *Wall. Cat.* 9024. G. coriacea, *Wight Ill.* i. 103; *Bedd. Fl. Sylv. Anal. Gen.* t. ix. Stemonurus polymorphus, coriaceus, Walkeri *and* Gardneri, *Miers Contrib.* i. 87. Platea Wightiana, *Miers,* l.c. i. 98.

Western Peninsula, Nilghiri Mts., *Wight;* Ceylon.

A small tree or large shrub, glabrous, or the young parts and leaves slightly puberulous. *Leaves* 2–6 by ½–2½ in., more or less coriaceous, opaque, inconspicuously veined; petiole ¼–½ in. *Cymes* puberulous. *Flower-buds* oblong-clavate. *Flowers* ⅛ in., 4–5-merous, hermaphrodite or unisexual. *Calyx* minute. *Corolla* campanulate, lobes acuminate, points inflexed. *Stamens* glabrous or slightly puberulous, free, or ultimately agglutinated into a tube, at length exserted. *Ovary* on an hypogynous disk; style short, conic, stigma minute. *Fruit* ½–¾ in., oblong or obovoid, reddish-brown.—The plant figured by Wight Icon. 953, as the male of this species has, as shown, hermaphrodite flowers, and the stamens are destitute of hairs. Miers in consequence, refers it to his *Platea Wightiana,* but it differs from *Platea* in the coherent petals and acute, not discoid, stigma. It is apparently the same form as Wight's *G. coriacea.*—Very variable. Wight Ill. p. 103, distinguishes the following varieties:—

Var. 1. *acuminata,* leaves oval attenuate at both ends terminating in a longish linear acumen.

Var. 2. *oblongifolia,* leaves linear-oblong obtuse at both ends abruptly acuminate.

Var. 3. *angustifolia,* leaves 5–7 by 1–2 in. narrow linear-lanceolate acuminate, base acute.

Var. 4. *longifolia,* leaves 5–7 by 1–2 in. linear acuminate, base rounded.

Var. 5. *ovalifolia,* leaves 2–3 by 1½ in. oval, obtuse at both ends or shortly acuminate.

3. **G. affinis,** *Mast.;* leaves glabrous oblong-lanceolate, base acute, cymes axillary 2–3 times longer than the petiole, flowers hermaphrodite.

Stemonurus prasinus, *Blume Mus. Bot.* i. 249. S. affinis, *Miers Contrib.* i. 94. Lasianthera prasina, *Miq. Fl. Ind. Bat.* i. 791.

MALACCA, *Griffith, Maingay.*—DISTRIB. Java.

A tree or shrub. *Branches* angular, tortuous. *Leaves* 3½–1½ in., petiole ⅓–¼ in. *Pedicels* pubescent. *Calyx* 4–5-toothed. *Corolla* ⅛ in., tubular-campanulate, 4–5-lobed, lobes ovate acute. *Filaments* hairy at the back near the top. *Ovary* cylindric; stigma large, discoid. *Fruit* oblong-obovate, narrowed at the base, surmounted by the remains of the stigma. *Seed* solitary, integument brown, traversed by the raphe, albumen copious; embryo minute, radicle superior, cotyledons plano-convex (Griff. Mss. in herb.)

4. **G. penangiana,** *Wall. Cat.* 7204; leaves oblong-acuminate, cymes extra-axillary erect much branched exceeding the petiole. Stemonurus penangianus, *Miers Contrib.* i. 90.

PENANG, *Wallich;* MALACCA, *Griffith, Maingay.* TENASSERIM, at Moulmein, *Lobb.*

A tree. *Shoots* terete, yellowish, glabrous. *Leaves* 5½ by 2 in., coriaceous, glabrous, margins revolute, base tapering; petiole ½ in. *Peduncles* 1 in. and upwards, setulose, 3–6-chotomous, ultimate pedicels shorter than the flower. *Flower* ⅙ in. *Calyx* pateriform, 4–5-toothed. *Corolla* many times longer than the calyx, funnel-shaped; limb 4–5-fid, lobes acuminate inflexed at the point, midrib prominent on the inner surface. *Stamens* 4–5, free, hypogynous, filaments flat, hairy at the back. *Pistil* rudimentary. FEMALE fl.: *Ovary* very short, 5-angled, depressed at the top; style conical, tubular, 5-toothed at the apex (Miers). *Immature fruit* ½ in., ovoid.—Miers describes the flowers of Wallich's plant as hermaphrodite. In Griffith's specimens, which are otherwise indistinguishable, they are unisexual. Arnott in Ann. des Sc. Nat. (Bot.) 1834, ii. 236, says, this plant does not belong to *Gomphandra*, but he gives no reason for this conclusion.

5. **G. tomentella,** *Mast.*; leaves pubescent beneath oblong-lanceolate acuminate, base acute, cymes axillary equalling the petiole, flowers hermaphrodite. Stemonurus? tomentellus, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 298.

BIRMA, *Griffith.*

Arborescent. *Shoots*, petioles, under surface of leaves and inflorescence yellow-tomentose. *Leaves* 6–7 by 1–1¾ in.; petiole ½ in. *Flowers* ⅛ in. *Calyx* cup-shaped, 4–5-toothed. *Corolla* 4–5-parted, pubescent externally, lobes acute, inflexed. *Stamens* exserted, filaments pilose at the apex behind and slightly so in front beneath the anther. *Ovary* oblong, pilosulous, surmounted by a large discoid stigma.

6. **G.? crassipes,** *Mast.*; leaves lanceolate or oblong-lanceolate acuminate, pedicels pilose. Stemonurus? crassipes, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 298.

PEGU, *Kurz.*

A shrub or small tree. *Leaves* 5–7 by 2 in., subcoriaceous, glabrous; petiole ⅓–½ in. *Cymes* axillary, as long as the petiole, pedicels $\frac{1}{12}$ in. *Calyx* coriaceous, cup-shaped, 5-toothed. Immature *fruit* ⅙–¼ in., turbinate, glabrescent, purplish, surrounded at the base by the persistent calyx.—Imperfect specimens only known.

14. **APODYTES,** E. Meyer.

Trees or shrubs. *Leaves* alternate, petiolate, simple, coriaceous, usually black in drying. *Flowers* small, in terminal or axillary corymbose cymes. *Calyx* minute, cup-shaped, 5-toothed. *Petals* 5, free, valvate. *Stamens* 5, alternate with the petals, filaments dilated; anthers long or short, oblong, basifixed, sagittate, 2-lobed, dehiscing longitudinally; pollen triangular. *Ovary* 1-celled, obliquely gibbous; style excentric, curved, stigma small; ovules 2, pendulous, superposed. *Drupe* obliquely ovoid, compressed, stone crustaceous. *Seed* pendulous; embryo small, in the apex of fleshy albumen, cotyledons narrow.—Distrib. Species 9, natives of tropical Asia and Africa.

* *Anthers* elongate, linear-oblong.

1. **A. Benthamiana,** *Wight Ic.* 1153; leaves glabrous oblong obtuse at both ends margins revolute, anthers and ovary puberulous. *Bedd. Fl. Sylv.* 140 var. *α.*

Western Peninsula in the Nilghiri Mts. and Southern provinces, *Wight*, *Beddome.*

Branches terete, glabrous, shoots puberulous. *Leaves* 3–4 by 1–1½ in., coriaceous, black in drying; petiole ½–1 in. *Panicles* terminal, rigid, shorter than the leaves, pedicels puberulous. *Flowers* ¼ in. *Petals* inflexed at the point. *Ovary* hairy. *Drupe* ¾ by ½ in., ovoid, reniform, crowned with the persistent base of the style, and furnished with a lateral scutelliform appendage, 1-seeded. *Seed* pendulous, obovate-cuneate, compressed.

2. **A. Gardneriana,** *Miers in Ann. & Mag. Nat. Hist. ser.* 2, vol. ix. 389; *Contrib.* i. 58; leaves oblong acute at both ends abruptly acuminate, margins revolute, anthers glabrous, ovary slightly puberulous. *Thwaites Enum.* 42.

Ceylon; Central province, alt. 5–7000 ft., *Gardner*, *Thwaites.*

Bark wrinkled. *Leaves* 2–4 by ¾ in., black in drying; petiole ½ in. *Cymes* peduncled, terminal, pedicels divaricate or ascending, ultimate pedicels shorter than the flowers. *Buds* elongate, oblong. *Flowers* ½ in.

3. **A. Beddomei,** *Mast.*; leaves membranous broadly ovate acute acuminate, margins flat, anthers and ovary glabrous. A. Benthamiana, var. *β*, *Bedd. Fl. Sylv.* 140.

Western Peninsula in the Nilghiri Mts., and Travancore, *Wight*, &c.

Quite glabrous. *Leaves* 3–4 by 1½–2 in., black in drying, base rounded or acute; petiole ¼–½ in. *Pedicels* pilosulous, ultimate pedicels shorter than the *flowers*. *Buds* oblong, obtuse. *Flowers* ⅛ in. *Fruit* ⅜ in., wrinkled.

** *Anthers* short, oblong.

4. **A. andamanica,** *Kurz Andam. Rep.* 5; *Journ. As. Soc. Beng.* 1872, ii. 298; leaves oblong acuminate not black in drying, cymes axillary short.

Andaman Islands, *Kurz.*

A small tree. *Branches* virgate, terete. *Leaf-buds* puberulous. *Leaves* 7–8 by 2½ in., glabrous, base obtuse or acute, midrib depressed above prominent beneath; petiole ½ in. *Cymes* peduncled, peduncles not much exceeding the petiole, strigose. *Flower* ⅙ in. *Calyx* puberulous, cup-shaped, scarcely lobed. *Petals* externally puberulous, oblong-acute, midrib prominent within. *Filaments* flat, ligulate; anthers short, oblong. *Drupe* 1½ in.; stone fibrous woody.

15. **MAPPIA,** Jacq.

Trees. *Leaves* alternate, petiolate, simple, 1-nerved. *Flowers* small, in terminal corymbose cymes. *Calyx* 5-toothed. *Petals* 5, usually hairy within. *Stamens* 5, hypogynous, alternate with the petals; anthers 2-lobed, dorsifixed, dehiscing longitudinally; pollen grains subquadrate. *Disk* hypogynous, cup-shaped. *Ovary* superior, 1-celled; style short; ovules 2, pendulous. *Fruit* drupaceous. *Seed* pendulous; embryo in fleshy albumen, cotyledons leafy, radicle superior.—Distrib. Species 8 or 10, natives of the Western Peninsula, Ceylon and tropical South America.

1. **M. tomentosa,** *Miers Contrib.* i. 67; leaves subcoriaceous ovate-oblong acute or acuminate densely pubescent beneath black when dry. Stemonurus ? fœtidus, *Wight Ic.* 955.

WESTERN PENINSULA, in the Nilghiri Mts., *Wight, Hohenacker.*

A large tree. *Bark* of branches yellow, wrinkled. Leaves 4–7 by 2–3 in., base obtuse, nerves prominent; petiole ½–¾ in., thinly tomentose. *Cymes* terminal, corymbose, many-flowered; peduncles very thick, half as long as the leaves, ultimate pedicels shorter than the flower. *Flower-buds* oblong, obtuse. *Flowers* ⅙ in., polygamous, villous externally, yellowish and very fetid. *Petals* oblong. *Stamens* glabrous. *Ovary* ovoid; style cylindric. *Drupe* ⅓–½ in., olive-shaped, purple, stone thin and soft.

2. **M. fœtida,** *Miers Contrib.* i. 64 (not Stemonurus fœtidus, *Wight*); leaves glabrescent ovate acuminate not black in drying, base rounded. Mappia fetida, *Bedd. Fl. Sylv.* t. 141 (not the text).

WESTERN PENINSULA; Nilghiri Mts. and Mysore, *Wight, &c.*

A large tree. *Bark* wrinkled. *Leaves* 2½–7 by 2–3¾ in., coriaceous, thinly pubescent, ultimately glabrous; petiole ¾–1 in. *Peduncles* half the length of the leaves, flattened, ultimate pedicels about 1/12 in., strigose. *Flower-buds* roundish-oblong. *Calyx* minute, lobed, lobes rounded. *Corolla* hairy within. *Anthers* roundish. *Ovary* half the length of the stamens. *Drupe* oblong, obtuse, ¾ by ⅜ in.

3. **M. ovata,** *Miers Contrib.* i. 65; leaves glabrous but with a few tufts of hairs in the axils of the nerves ovate-oblong abruptly and shortly acuminate, base inequilateral acute. M. fœtida *a*, *Thwaites Enum.* 43. M. Gardneriana *and* Wightiana, *Miers Contrib.* i. 66, 67.

WESTERN PENINSULA; hills of the Southern Carnatic and Travancor, *Wight, &c.* CEYLON, ascending to 7000 ft.

Branchlets angular. *Leaves* 6½ by 2¼ in., shining above, glaucous beneath with resinous spots; petiole 2–2½ in. *Panicle* terminal, pedicels strigose. *Flower-buds* clavate. *Flowers* ⅙ in. *Calyx* cup-shaped, 5-toothed, strigose. *Petals* 5, oblong, acute, connate at the base, hairy on the inner surface. *Filaments* subulate, glabrous, anthers ovoid, acute. *Ovary* ovoid, hairy, tapering into a club-shaped style and surrounded at the base by an hypogynous cup-shaped disk. *Fruit* ¾ in. by ½ in., ovoid, acute, stone thin, 1-seeded; cotyledons large, flat, leafy, palminerved; radicle thick, albumen fleshy.—There is a little difference in the shape of the leaves in the Cingalese specimens, the base being more rounded and the petiole not so long.

4. **M. oblonga,** *Miers Contrib.* i. 65; leaves oblong acute at both ends, glabrous except along the nerves or sparingly setose. ? *Dalz. & Gibs. Bomb. Fl.* 28. M. Championiana, *Miers* l.c. 66. M. fœtida β, *Thaites Enum.* 43.

WESTERN PENINSULA; in the Concan, *Dalzell;* Travancor, *Wight;* CEYLON, ascending to 7000 ft., *Champion.*

A tree. *Leaves* 4–7 by 2¼–3 in.; petiole 1–1¼ in.; cymes terminal, lax, pubescent; ultimate pedicels as long as the flowers. *Flowers* ⅛ in., pilose. *Fruit* ¾ in, ovoid-oblong, purple.—The plant intended by Dalzell and Gibson may be *M. tomentosa* of Miers.

VAR. *elliptica,* Miers, l.c., branches angular, leaves smaller ovate acute. "*Cordia,*" Wall. Cat. 9064.—Travancor.

16. PHLEBOCALYMNA, Griff.

Trees. *Leaves* alternate, petiolate, simple, coriaceous. *Flowers* polygamous; *males* in globose heads, borne on short spikes; *females* shortly pedicelled. *Sepals* 5, distinct, imbricate. *Corolla* tubular, limb 5-parted. *Stamens* 5, alternate with the petals, adherent to the tube of the corolla; anthers ovoid-oblong, dorsifixed, 2-lobed, dehiscing longitudinally. *Disk* fleshy, hypogynous, 5-lobed, lobes opposite the petals. *Ovary* conic, 1-celled; style subulate; ovules 2, pendulous. *Fruit* oblong with a crustaceous rind. *Seed* pendulous; albumen coriaceous, lobulate, ruminate; embryo minute.—DISTRIB. Species 2 or 3, natives of the Malay peninsula and islands.

1. **P. Griffithiana,** *Mast.*, leaves obovate-oblong shortly and abruptly acuminate, stamens adherent to the base of the corolla. Platea Griffithiana, *Miers Contrib.* i. 97.

TENASSERIM; at Mergui, *Griffith.*

A glabrous shrub. *Branches* terete, slender, slightly compressed, rugose, yellowish. *Leaves* 6–8 by 3 in., coriaceous, glabrous, pale, concolorous, midrib prominent beneath, margins revolute; petiole $\frac{1}{4}$–$\frac{1}{2}$ in., sulcate. *Cymes* axillary, erect, spicate, scarcely longer than the petiole, few-flowered; pedicels puberulous. *Calyx-lobes* imbricate, ovate, ciliolate. *Corolla* much longer than the calyx, funnel-shaped, limb 5-lobed, lobes ultimately inflexed at the point. *Filaments* linear, glabrous. *Ovary* very short, surrounded by a pentagonal disk, 1-celled; style conic, pilosulous, stigma obscurely 3 lobed. *Fruit* $1\frac{1}{2}$ by $\frac{3}{4}$ in., oblong, obtuse; stone thick, bony, 1-celled by abortion. *Seed* solitary, pendulous from the apex of the cell, integument densely permeated by spiral vessels, albumen fleshy lobulate.—Kurz refers Miquel's *Gonocaryum? gracile* to this species, but Miquel's plant is described as having a longer inflorescence, two styles and a different fruit.

2. **P. Lobbiana,** *Mast.*; leaves oblong acuminate, stamens adherent to the corolla for the greater part of their length. Platea Lobbiana, *Miers Contrib.* i. 97; *Wall. Cat.* 9052.

RANGOON, MARTABAN, and TENASSERIM; *Wallich, &c.*

A shrub or tree? *Branches* angular. *Leaves* $4\frac{1}{2}$–$5\frac{1}{2}$ by $1\frac{3}{4}$–$2\frac{1}{4}$ in., coriaceous, glabrous, margins revolute, nerves prominent beneath; petiole $\frac{1}{4}$ in., sulcate, rugose. *Cymes* axillary, peduncled; peduncle erect, shorter than the petiole. *Flowers* subfascicled, $\frac{1}{4}$ in. *Calyx* $\frac{1}{12}$ in., cup-shaped, lobes imbricate. *Corolla* $\frac{1}{4}$ in., funnel-shaped, limb 5-lobed; lobes oblong, recurved. *Filaments* glabrous; anthers ovoid, compressed, connective wide at the base. *Disk* hypogynous, 5-lobed. *Ovary* hirsute, ovoid, tapering into a short style. *Fruit* $1\frac{3}{4}$ in., oblong, obtuse, olive-coloured, obscurely 2-celled.

A plant collected by Wallich in Tavoy (Cat. 9051), has the habit, inflorescence, and floral characters (ovary not seen) of *Phlebocalymna*, but the fruit is different, and more like that described by Miquel under his *Gonocaryum? gracile* (Fl. Ind.-Bat. Suppl. i. 343). Indeed, I should refer both Wallich's 9051, and Helfer's 817, Kew. dist. from Tenasserim? which evidently belong to the same species, to Miquel's genus, but for the different habitat (Miquel's plant is Sumatran), and that I have not seen either the ovaries of Wallich's or Helfer's plant in any specimen of Miquel's. Kurz, in Journ. As. Soc. Beng. xxxix. pt. 2, p. 72, refers *Gonocaryum? gracile* to *Phlebocalymna Griffithii*, from which it differs in the longer inflorescence, and especially in the fruit.—The following description applies to Wallich's plant, to which I would give the provisional name *Gonocaryum? Wallichii;* A glabrous shrub. *Branches* terete, bark yellow. *Leaves* 6 by 3 in., glabrous, coriaceous, oblong, tapering to both ends, shortly acuminate, entire; nerves depressed on the upper, prominent on the lower surface; petiole scarcely $\frac{1}{2}$ in., rugose, channelled. *Racemes* axillary, solitary or geminate, half the length of the leaves; rachis angular; pedicels $\frac{1}{8}$ in., horizontal, ciliated, 1–2-flowered. *Flowers* unisexual or polygamous? *Calyx* pateriform, deeply divided into 5 imbricate, ovate acute, ciliated lobes. *Corolla* twice the length of the calyx, cylindric, obtuse; petals erect, thick green, oblong with inflexed points, valvate and cohering by the margins but readily separable. *Stamens* 5, alternate with the petals and agglutinated to their edges, but easily separable, filaments glabrous, anthers 2-celled, introrse. *Ovary* abortive; style 1, filiform, covered with short erect white appressed hairs. *Fruit* 2 by 1 in., obliquely oblong, tapering to both ends, 1-celled; rind fibrous, corky. *Seed* not seen.

17. PTELEOCARPA, Oliv.

Trees. *Leaves* alternate, simple, 1-nerved, petiolate. *Inflorescence* terminal, panicled, many-flowered. *Flowers* regular, dichlamydeous, hermaphrodite. *Calyx* tubular below, limb deeply 5-parted, lobes imbricate, not accrescent. *Corolla* tubular below, limb deeply 5-parted, lobes imbricate, glabrous. *Stamens* 5, glabrous, springing from the tube of the corolla, alternate with its lobes; anthers linear, innate, dehiscing longitudinally. *Staminodes* 0. *Ovary* free, stipitate, 2-celled; styles 2, stigma minute; ovules solitary in each cell, pendulous, anatropal, raphe lateral or subventral. *Fruit* 2-celled, compressed, orbicular, emarginate, deeply winged, wings striate. *Seed* elongate, compressed, albuminous; radicle superior, cylindrical, cotyledons linear-lanceolate longer than the radicle.—DISTRIB. Species 2, one Malayan, the other from Borneo.

By reason of the imbricate calyx and stamens alternate with the petals, this genus should be placed in *Icacineæ*, but the structure of the ovary is that of *Olacineæ.* The fruit is quite distinct.

1. **P. malaccensis,** *Oliv. in Trans. Linn. Soc.* xxviii. 515, t. 42.

MALACCA, *Maingay.*—DISTRIB. Borneo.

Quite glabrous. *Branchlets* terete. *Leaves* 3–5 by 1¼–2 in., membranous, oblong or oblanceolate, abruptly acuminate, base narrowed, midrib prominent beneath; petiole ⅓–¾ in. *Panicles* terminal, scarcely exceeding the leaves. *Bracts* minute, ovate, deltoid. *Pedicels* ¼–⅓ in., slender, ascending, sometimes clustered in umbellate cymes. *Flowers* ⅓ in. diam., yellow or red, glabrous. *Calyx-lobes* ovate, roundish, obtuse. *Corolla* 4 times longer than the calyx, tube short; lobes oblanceolate, oblong, obtuse. *Stamens* as long as the corolla, filaments filiform, glabrous; anthers basifixed. *Ovary* glabrous, oblong, obtuse, compressed, obscurely furrowed, seated on a thick stipes. *Fruit* 1¼–1½ in. diam. *Seed* ½ in.; embryo half the length of the fleshy albumen.

18. PHYTOCRENE, Wall.

Climbing shrubs, usually more or less hairy, often prickly; wood with very large porous vessels and thick medullary rays, but no annual rings. *Leaves* alternate, petiolate, entire or palmately lobed. *Flowers* diœcious; male in small globose clusters borne on long branching spikes; female in large solitary globose pedunculate clusters. MALE fl.: *Calyx* of 3–5 free segments, usually anisomerous with the petals. *Corolla* tubular-campanulate, 4- rarely 5-parted, lobes valvate. *Stamens* as many as the lobes of the corolla and alternate with them, filaments hypogynous; anthers 2-lobed, dehiscing longitudinally; pollen-grains globose. *Pistil* rudimentary, hispid. FEMALE fl.: *Calyx* and *Corolla* of the male. *Stamens* 0. *Staminodes* minute or 0. *Ovary* sessile, 1-celled; style thick columnar, stigma capitate more or less lobed; ovules 2 descending from the apex of the cavity, raphe dorsal; micropyle superior. *Drupes* many, in globose heads, bristly or echinate; stone hard, 1-celled, 1-seeded, pitted externally. *Seed* pendulous; embryo as long as the fleshy albumen, radicle superior short, cotyledons large flat appressed.—DISTRIB. Species 8, all natives of India and the Archipelago.

1. **P. gigantea,** *Wall. Pl. As. Rar.* iii. 11, t. 215; branches prickly, leaves cordate-ovate acute obscurely lobed pilose along the nerves beneath, bracts 0 or shorter than the pedicel. *Wall. in Phil. Mag.* iii. 223; *Cat.* 4946. P. callicarpa, *Griff. Notul.* iv. 327, t. 490. Gynocephalum giganteum *Trécul in Ann. Sc. Nat. ser.* 3, viii. 149.

MARTABAN, *Wallich.*

Branches spirally grooved, studded with conical prickles. *Leaves* 4–10 by 4–7 in., palmately 5–7-nerved, glabrescent above, villosulous beneath, rusty-pilose along the prominent nerves; petiole 2–3 in., hairy. MALE fl. in long (8–10 in.), pendulous, axillary, racemes, or from the old wood; rachis and pedicels hairy; pedicels supporting a globose head of flowers. *Bracts* 0 or shorter than the pedicel. *Flowers* $\frac{1}{10}$ in., setose. *Sepals* oblong obtuse concave at the apex, anisomerous with the corolla. *Corolla* funnel- or bell-shaped, twice the length of the calyx, bristly externally with uncinate bristles, limb 4-lobed, lobes ovate-lanceolate. *Stamens* 4, alternate with the lobes of the corolla; filaments and anthers glabrous. *Pistil* rudimentary, hairy. FEMALE fl. not seen. *Fruit* covered with subulate bristles.

2. **P. bracteata,** *Wall. Pl. As. Rar.* iii. 12; branches prickly, leaves cordate-ovate entire or slightly lobed, bracts (of male spikes) linear longer than the pedicel. *Wall. Cat.* 4947. P. macrocarpa, *Griff. Notul.* iv. 322; *Ic. Pl. Ind. Or.* 487. Gynocephalum bracteatum, *Trécul in Ann. Sc. Nat. ser.* 3, viii. 149.

PENANG, *Porter;* MALACCA, *Griffith, Maingay.*—DISTRIB. Borneo.

Stem tubercled, tubercles ending in a spine. *Branches* covered with minute prickles. *Leaves* 6–7 by 4½–5 in., coriaceous, asperulous above, pubescent beneath, palmately 5–7-nerved, nerves prominent beneath; petiole 2½ in. MALE fl. small, in axillary hoary racemes each about 8 in.; pedicels slender, each supporting 3 small heads of flowers and subtended by a long linear bract adnate to its base and studded with hooked bristles. MALE fl.: *Sepals* 3–5, truncate. *Corolla* longer than the calyx-lobes, rounded, inflexed, setose externally. *Stamens* 3–5. *Rudiment of ovary* oblong, setose. FEMALE fl. (according to Griffith), in rounded, peduncled capitula; peduncles 3 from the same axil, as long as the petiole, flattened, strigose. *Calyx* of 4 spathulate, concave sepals. *Corolla* 4-parted. *Ovary* strigose; style short or 3-partite, stigmas 3; ovules anatropal, pendulous. *Drupes* in globose masses the size of a man's head, each 1½ by ¾ in., ovoid, acute at both ends, densely covered with slender, appressed, yellow setæ, 1-celled. *Seed* 1, albumen fleshy, papulose on the surface, smelling of linseed oil; radicle broad; cotyledons small, suborbicular.

3. **P. oblonga,** *Wall. Pl. As. Rar.* iii. 12; branches not prickly, leaves oblong-lanceolate entire pubescent beneath, bracts shorter than the pedicels. *Wall. Cat.* 4948. Gynocephalum oblongum, *Trécul in Ann. Sc. Nat. ser.* 3, viii. 149.

PENANG, *Wallich,* &c.; MALACCA, *Griffith, Maingay.*

Bark striated, brownish. *Leaves* 8 by 3 in., coriaceous, glabrous above, pubescent beneath, shortly acuminate, 1-nerved, base acute; petiole ½ in., rugose. MALE fl. in axillary racemes or in tufts from the old wood. *Racemes* slender, densely covered, like the pedicels, bracts and perianth, with brown hairs; pedicels filiform, 3-flowered. *Bracts* linear, half the length of the pedicel and more or less adnate to it. *Sepals* 4, obovate, obtuse, concave. *Corolla* 4-parted, lobes rounded. *Stamens* 3–4. *Pistil* rudimentary. FEMALE fl. (according to Maingay): *Sepals* linear-oblong, pale brown, hirsute. *Petals* connate for ½ their length into an infundibuliform corolla; lobes ovate, obtuse, hirsute. *Ovary* 1-celled, with 2 collateral, suspended ovules; style twice the length of the corolla, cylindric, ventricose, hirsute, 2–3-partite, divisions subacute, stigmatic on their inner surface. *Drupes* in globular masses the size of a man's fist, each 2 by ¾ in., oblong-obovoid, obtuse, covered with stout, straight, subulate prickles which, falling off, leave circular pits; epicarp coriaceous, mesocarp pulpy, stone crustaceous. *Cotyledons,* according to Maingay, thin, white, divaricate, tortuous, branched, (?) embedded in a fleshy lobulated albumen.

4. **P. palmata,** *Wall. Pl. As. Rar.* iii. 12; stem prickly, leaves palmately 5-lobed ferruginous-hairy beneath, bracts shorter than the pedicels. *Wall. Cat.* 4949. P. stylocarpa, *Griff. Notul.* iv. 320; *Ic. Pl. Ind. Or.* 489. Gynocephalum palmatum, *Trécul in Ann. Sc. Nat. ser.* 3, viii. 149.

PENANG, *Porter*, &c.; MALACCA, *Griffith.*—DISTRIB. Java.

Branches studded with minute prickles; shoots, petioles, and nerves of leaves ferruginous hispid. *Leaves* very large, orbicular, cordate, palminerved, lobed halfway down; lobes oblong-obovate, acute; petiole 4–6 in. MALE fls. in long, axillary, dense, branched racemes, each pedicel supporting a globose head of flowers. *Flowers* $\frac{1}{12}$ in. *Calyx* of 3–4 obovate, concave, hairy segments. *Corolla* longer than the calyx, deeply 4-parted, lobes lanceolate acute setose. *Stamens* 4, filaments glabrous; anthers apiculate. *Rudiment of ovary* minute, hairy. FEMALE fl. not seen. *Drupes* $1\frac{1}{2}$ by 1 in., oblong-turbinate, surmounted by the thickened base of the style and covered by dense subulate bristles, some of which are barbed and have a transparent point. *Seed* pendulous; radicle superior, very short; cotyledons elongate, linear-oblong, leafy.

19. **MIQUELIA,** Meissner.

Climbing shrubs. *Wood* with large vessels. *Leaves* alternate, petiolate, simple, membranous, usually palminerved. *Peduncles* supra-axillary, racemose in the male, solitary in the female plant. *Flowers* diœcious, capitate. MALE fl.: *Calyx* minute, 4–5-fid. *Corolla* separated from the calyx by a long pedicel-like stipes (corolla-tube?), limb 4–5-lobed, lobes valvate, apex inflexed. *Stamens* isomerous and alternate with the lobes of the corolla, filaments short; anthers introrse. FEMALE fl.: *Calyx* as in the male. *Corolla* not removed from the calyx, lobes free, or nearly so, ultimately reflexed. *Staminodes* 4–5, very small, alternate with the lobes of the corolla or 0. *Ovary* sessile, 1-celled; style short, stigma dilated cup-like; ovules 2, pendulous from the apex of the cavity, raphe dorsal, micropyle superior. *Drupe* oblong, more or less compressed, surrounded at the base by the persistent calyx, mesocarp thin, endocarp crustaceous externally rugose. *Seed*, solitary, pendulous albumen fleshy rugulose; radicle superior; cotyledons elliptic, thick, leafy flat. — DISTRIB. Species 5, (perhaps all forms of one variable species, *Baillon*), distributed in India and the Archipelago.

The materials in herbaria are not good, and the structure of the male flowers especially requires further examination in a fresh state.

1. **M. Kleinii,** *Meissn. Gen.* 152; leaves obovate-lanceolate shortly and abruptly acuminate subentire or crenulate. Miquelia assamica, *Blume Rumphia*, iv. 37. Jenkinsia assamica, *Griff. in Calc. Journ. Nat. Hist.* iv. 231, t. 12; *Notul.* 370, t. 537, f. 2. Araliacea? Kleinii, *W. & A. Prodr.* i. 375. Phytocrene sp. *Wight Ill.* ii. 62.

ASSAM, *Griffith*; KHASIA MTS., *H. f. & T.*

Glabrescent. *Branches* strigose when young. *Leaves* 7–8 by 3 in., glabrous, base tapering, rarely subhastate; petiole $1\frac{3}{4}$–2 in. *Peduncles of male plant* 1–2 in., filiform. *Flowers* capitate, $\frac{1}{8}$ in. *Calyx* minute, 3–5-fid. *Corolla* 4–5-parted, lobes oblong, free, valvate. *Filaments* very short, anthers elongate. *Rudiment of pistil* depressed. *Peduncles of female plant* short, thick. *Calyx* minute, 4–5-lobed. *Corolla* 4–5-parted, lobes reflexed, greenish. *Staminodes* minute. *Ovary* ovoid, apex truncate; stigma sessile, 4-lobed. *Drupe* $\frac{3}{4}$ by $\frac{1}{2}$ in. subsessile, yellowish, obliquely ovoid.

2. **M. dentata,** *Bedd. in Trans. Linn. Soc.* xxv. 211, t. 23; leaves oblong acuminate remotely and coarsely toothed, base truncate cordate.

WESTERN PENINSULA; Anamallay forests, *Beddome*.

Branches terete, glabrous. *Leaves* 8 by $3\frac{3}{4}$ in., membranous, glabrous; petiole 2 in. MALE fl. capitate on supra-axillary racemose peduncles which are shorter than the petiole. *Flower-buds* club-shaped, truncate. *Calyx* subcampanulate, 4-toothed. *Corolla-lobes* lanceolate. *Stamens* 4, anthers oblong, base sagittate. *Pistil* minute, rudimentary. FEMALE fl. capitate, on a solitary supra-axillary peduncle longer than the petiole. *Calyx* deeply toothed. *Corolla-lobes* lanceolate. *Ovary* obovoid, base tapering; style very short, dilated into a cup-shaped stigma; ovules 2.

3. **M.? gibba,** *Baill. Adansonia,* x. 278; *DC. Prodr.* xvii. 15; leaves ovate acuminate entire, base rounded 5-nerved.

WESTERN BENGAL, *Griffith.*

Branches terete, glabrous. *Leaves* 8 by 4 in., membranous, glabrous, nerves prominent beneath. *Drupe* 1¼–1½ in., ellipsoid, glabrescent, brownish, convex on one side, furrowed on the other, gibbous towards the base; stone hard, granular. *Cotyledons* thin.—An imperfectly known species. I have seen no specimens.

20. SARCOSTIGMA, W. & A.

Climbing shrubs. *Wood* without zones. *Leaves* alternate, simple, shortly petioled. *Flowers* diœcious, minute, arranged in tufts along a long pendulous rachis. MALE fl.: *Calyx* minute, 4–5-lobed. *Petals* 5, free, or nearly so, valvate, oblong, ultimately reflexed. *Stamens* 5, alternate with the petals, free, or adnate to the base of the petals, filaments glabrous; anthers erect, 2-celled, dehiscing longitudinally. *Pistil* rudimentary. FEMALE fl.: *Calyx* and *corolla* as in the male. *Staminodes* 4–5, hypogynous, alternate with the petals. *Ovary* superior, sessile, 1-celled; stigma subsessile, globose or umbonate; ovules 2, collateral, pendulous, funicle expanded into an "obturator." *Drupe* surrounded at the base by the persistent calyx and corolla, epicarp coriaceous, endocarp woody lined with a thin white membrane. *Seed* (according to Baillon) pendulous, exalbuminous; cotyledons fleshy, wrapping round the short superior radicle.—DISTRIB. Species 3 or 4, all tropical Asiatic.

1. **S. Kleinii,** *W. & A. in Edin. New Phil. Journ.* xiv. 299; leaves glabrous oblong or oblong-lanceolate acuminate. *Miers in Ann. Nat. Hist. ser.* 2, 116; *Contrib.* i. 103, t. 18; *Wight Ic.* t. 1854; *Dalz. & Gibs. Bomb. Fl.* 221.

EASTERN AND WESTERN PENINSULAS; Malacca, *Maingay,* Cochin and Travancor, *Wight;* the Concan, *Stocks.*

A climbing, branched shrub. *Branches* terete. *Leaves* 4–10 by 2–4 in., coriaceous, pale on both surfaces, base rounded, nerves prominent beneath; petiole ¾ in., transversely wrinkled. *Rachis* extra-axillary, angular, covered with brownish strigose hairs. *Flowers* ⅛ in. diam. MALE fl.: *Calyx* minute, pilosulous, cup shaped, obscurely 4–5-lobed. *Petals* $\frac{1}{12}$ in., glabrous, oblong, acute. *Stamens* as long as the petals, filaments glabrous, flat, strap-shaped; anthers 2-celled. *Rudiment of pistil* conical. FEMALE fl.: *Calyx* and *corolla* as in the male. *Ovary* obovoid, pilosulous, surrounded by 5 hypogynous, abortive stamens; stigma subsessile, conical; ovules 2, collateral. *Fruit* 1–1½ in. olive-shaped, somewhat compressed, bright orange-red, rugose and strigose externally, smooth within.

2. **S. Wallichii,** *Baill. in Adansonia,* x. 282; leaves downy beneath along the nerves ovate acute or acuminate, fruiting peduncles densely villous. *Wall. Cat.* 9030 ("indeterm.")

BIRMA; Phanoc Hill on the Saluen, *Wallich.*

Branches terete, rugose. *Leaves* 6 by 3 in., nerves depressed above, prominent beneath; petiole ⅛ in., thick. *Fruiting peduncles* from the old wood. *Calyx* minute, villous, 4-fid. *Fruit* 3¼ in., ovoid-oblong, compressed, densely hairy.—The specimens are very imperfect.

3. **S. edule,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 298; glabrous, leaves ovate-oblong apiculate, spikes rusty-tomentose. Chailletia edulis, *Kurz in Andam. Rep. App. B* 6.

ANDAMAN ISLES, *Kurz.*

Branches woody. *Leaves* 7 by 3½ in., coriaceous, glabrous, base obtuse; petiole short. *Fruit* 1 in., obliquely oblong, obtuse, densely covered with orange-coloured down, shining white within, pulp sweet, edible (*Kurz*).—Probably only a form of *S. Kleinii.*

21. **NATSIATUM,** Ham.

A climbing shrub. *Wood* porous, with inconspicuous medullary rays. *Leaves* alternate, petiolate, simple, 7–9-nerved. *Flowers* diœcious, in supra-axillary racemes. MALE fl.: *Calyx* deeply 5-parted, persistent, not accrescent. *Petals* 5, free, or united at the base. *Staminodes* 5, opposite the petals, outside the stamens. *Fertile stamens* alternate with the petals; anthers erect, apiculate, bilocular, dehiscing longitudinally. *Pistil* rudimentary. FEMALE fl.: *Sepals* and *petals* as in the male. *Staminodes* 4–6, hypogynous, alternating with an equal number of compressed glands. *Ovary* sessile, villous; style short, apex 2–3-lobed, stigmas capitate; ovules 2, collateral, pendulous, raphe dorsal. *Drupe* obliquely ovoid, compressed; stone crustaceous, 1-celled. *Seed* solitary, albumen fleshy; radicle superior, cotyledons leafy, orbicular, 3–5-nerved.

1. **N. herpeticum,** *Ham. in Wall. Cat.* 4252; *Arn. in Edin. New Phil. Journ.* xvi. 314; N. sp. *Griff. Notul.* iv. 330; *Ic. Pl. As.* t. 496, f. 1. Natsiatum herpeticum, *Ham. ex R. Br. in Benn. Pl. Jav. Rar.* 245; *Miq. Fl. Ind. Bat.* i. pt. i. 797. Sicyos pentandrus, *Wall. Cat.* 6682, ♂.

EASTERN BENGAL and the HIMALAYA, from Nipal, Sikkim, Silhet, and the Khasia Mts., alt. 3000 ft., to CHITTAGONG and PEGU.

Herbaceous portions strigose. *Branches* as thick as a goose-quill. *Leaves* distant, 3–6 in., membranous, roughish, cordate-ovate, acute, repand, 7–9-nerved; petiole longer than the blade. *Racemes* supra-axillary, long, slender, pendulous, many-flowered. *Bracts* small, linear, pedicels about the length of the flower. *Flowers* minute, greenish-yellow. MALE. fl.: *Calyx* lobes valvate, lanceolate, scabrid. *Petals* 5, alternate with the calyx-lobes and one-third longer, lanceolate. *Glands* (staminodes?) 5, fleshy, 2-lobed. *Fertile stamens* opposite the sepals, filaments very short; anthers sagittate; connective glandular. FEMALE fl.: *staminodes* subulate. *Drupe* ¼ in.

DOUBTFUL SPECIES.

N. GAMOSEPALUM, *Griff. Notul.* iv. 330. Menispermea, *Itin. Notes* 114, is Lophophyllum bicristatum, *Griff.* (See p. 105.)

22. **IODES,** Blume.

Climbing shrubs, rarely erect. *Leaves* opposite, or subalternate, petiolate, simple, 1-nerved. *Inflorescence* cymose, cymes axillary or extra-axillary; lower peduncles often sterile, cirrose. *Flowers* dichlamydeous, diœcious. MALE fl.: *Calyx* minute, cup-shaped, 5-toothed. *Corolla* 3–5-merous, lobes valvate. *Stamens* hypogynous, equal in number to, and opposite the lobes of the corolla; anthers basifixed, straight, 2-celled, introrse, dehiscing longitudinally. *Pistil* rudimentary. FEMALE fl.: *Calyx* as in the male. *Corolla* 4–5-parted, tubular below and often dilated. *Staminodes* 0. *Ovary* subsessile, 1-celled, with 2 collateral pendulous ovules; funicle dilated into an "obturator;" stigma sessile, discoid, 5-lobed. *Drupe* surrounded at the base by the persistent, but not accrescent calyx, stone 1-seeded. *Seed* pendulous, testa thin, albumen fleshy; cotyledons flat, leafy; radicle superior.—DISTRIB. Species about 6, natives of India, the Archipelago, and of tropical Africa.

SECT. 1. **Eviodes,** *Baillon.* *Pedicels* slender, not woody.

1. **I. ovalis,** *Blume Bijdr.* i. 30; leaves ovate acute or acuminate, base rounded, male flowers panicled. *Br. in Benn. Pl. Jav. Rar.* 243, t. 48; *Hassk. Cat. Pl. Hort. Bogor.* 172; *Miq. Fl. Ind. Bat.* i. 795. I. tomentella, *Miq. l.c.* 796. Natsiatum oppositifolium, *Planchon in Hook. Lond. Journ. Bot.* v. 247 (name only).

MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Philippines.

A climbing shrub, rarely sub-arborescent. *Branches* terete, covered with rufous tomentum. *Tendrils* axillary or opposite the leaves. *Leaves* 5 by 4 in., subcoriaceous, glabrous above, except along the midrib, tomentose beneath, ovate or roundish; petiole ¼ in. *Cyme* (of male plant) much branched, peduncles 6–8 in., pedicels spreading *Flower-buds* subglobose, densely rufous-villous. *Calyx* ciliate. *Corolla* much exceeding the calyx; lobes lanceolate, inflexed at the points, ciliate, connate at the base. *Stamens* shorter than the lobes of the corolla, filaments short erect; anthers oblong-obovate, dehiscing longitudinally. *Rudiment of pistil* erect, cylindrical, or subclavate, hispid. FEMALE fl.: *Calyx* tubular, limb as in the male fl. *Corolla* 4–5-parted, subrotate, lobes acute reflexed globose beneath. *Ovary* substipitate, ovoid, compressed, densely villose; stigma thick, orbicular, crenate, concave. *Drupe* ½ by ¼ in., rather dry, ovoid, compressed, villous, mesocarp thin.—Miquel's *I. tomentella* (*I. ovalis,* var. β *Miquelii,* Baill. in DC. Prodr. xvii. 23), seems to differ only in its more dense covering of rufous tomentum. Maingay's Malacca specimens belong to this form.

SECT. 2. **Lasiodes,** *Baillon.* *Pedicels* thick, woody.

2. **I. Hookeriana,** *Baill. in Adansonia,* x. 268, *and in DC. Prodr.* xvii. 24; leaves oblong-ovate or ovate acuminate, base acute or cordate.

ASSAM, *Griffith;* CHITTAGONG, *H. f. & T.*

Branches cylindric or subangled, setose, ultimately glabrous. *Leaves* 4–8 by 1¾–4 in., opposite or subalternate, coriaceous, glabrous above, setose beneath along the prominent nerves; petiole ¼ in., rugose, articulate at the base, covered with rigid, brownish hairs. *Inflorescence* extra-axillary; peduncle rugose, as long as the petiole, dichotomous; pedicels spreading, thickened at the apex. MALE fl. ⅙ in. *Calyx* pateriform, limb shortly 5-lobed, lobes deltoid acuminate. *Corolla* twice the length of the calyx, densely hairy at the base externally, deeply 5-parted; lobes thick, oblong, with inflexed points. *Stamens* 5, free, hypogynous, half the length of the petals and concealed within them, filaments glabrous; anthers shorter than the filaments, erect, adnate, base sagittate. *Rudiment of pistil* conical. *Drupe* the size of a pigeon's egg, acute at the apex, yellowish-red, glabrous; stone compressed, woody, somewhat rugose, 1-celled. *Seed* ovate, compressed.—I have not examined the female flowers. In the unopened male bud I found the pollen shed.

3. **I. Thomsoniana,** *Baill. in Adansonia,* x. 270, *and in DC. Prodr.* xvii. 25; leaves oblong-obovate acuminate, base narrowed cordate.

CHITTAGONG, *H. f. & T.*

A climber. *Branches* woody, terete, sulcate, grey, deeply scarred, young shoots and petioles densely rusty setose. *Leaves* 10 by 3 in., at length glabrous, repand, basal lobes rounded, midrib downy beneath; petiole ¼ in. *Inflorescence* extra-axillary, cymose; peduncles short, woody, pedicels divaricate. MALE fl. as in *I. Hookeriana,* but petals relatively shorter and broader.—An imperfectly known species, probably as suggested by Baillon himself a mere form of *I. Hookeriana.*

DOUBTFUL SPECIES.

4. **I.? Brandisii,** *Kurz in Journ. As. Soc. Beng.* ii. 1872, 298; leaves oblong acuminate mucronate, base obtuse, petiole long slender.

TENASSERIM, *Kurz.*

A climbing cirrose shrub. *Leaves* 6–8 in., membranous, tomentose along the nerves above, over the whole surface beneath. *Cymes* opposite the leaves, pedicels short, slender. *Flowers* minute, tomentose.—Only known from Kurz's description.

5. **I. oblonga,** *Planch. in herb. Kew.*; leaves oblanceolate, base tapering subcordate.

PENANG? *Wallich.*

Shrubby, scandent? *Branches* cylindric, grey, setose, ultimately glabrescent, with prominent scars. *Leaves* 5 by 1½ in., membranous, glabrous above, setose along the midrib above, and over the whole lower surface; petiole ¼ in. *Inflorescence* inter-axillary, peduncles 1 in., cymose, dichotomously branched. *Flowers* very minute. *Ovary* oblong, 1-celled; stigma sessile, thick, discoid, 5-lobed; ovules 2, pendulous.—I have not seen perfect flowers, but the structure of the ovary is that of *Iodes.*

GENUS OF DOUBTFUL AFFINITY.

23. CARDIOPTERIS, Wall.

A climbing herb with milky juice. *Leaves* alternate, long-petioled, simple or lobed, cordate, palminerved. *Flowers* ebracteate, in axillary racemose or panicled cymes, bisexual, dichlamydeous. *Calyx* 4–5-parted; lobes imbricate, persistent, but not, or only slightly accrescent. *Corolla* deciduous, between rotate and funnel-shaped, 4–5-lobed. *Stamens* 4–5, inserted on the base of the tube of the corolla, alternate with its lobes, filaments short glabrous; anthers 2-celled, introrse, dehiscing longitudinally; pollen-grains 4-angular. *Ovary* free, surrounded at the base by a thick fleshy annular disk, oblong, compressed, 1-celled; ovules 1 (rarely 2) pendulous, naked, micropyle ultimately superior; style 2-branched, one branch deciduous, curved, capitate at the apex, the other accrescent, ultimately deciduous, divided at the apex into 2 unequal, ovate, rather obtuse divisions. *Fruit* ovate-orbicular, emarginate or obcordate, compressed, very broadly winged, 1-celled, indehiscent. *Seed* solitary, linear, furrowed; embryo minute, in hard fleshy albumen.—The following is the only species.

1. **C. lobata,** *R. Br. in Wall. Cat.* 8033 A, *and in Benn. Pl. Jav. Rar.* 246, t. 49. *Miq. Fl. Ind. Bat.* i. pt. i. 799. C. moluccana, *Blume Rumph.* iv. 207, t. 177, f. 2, *partly.* C. javanica *Blume Rumph.* iii. 206, iv. t. 177. C. Rumphii, *Baill. in Adansonia* x. 280, *and in DC. Prodr.* xvii. 26. Peripterygium quinquelobum, *Hassk. Cat. Pl. Hort. Bogor.* 351.

WESTERN BENGAL, in Silhet and Cachar. RANGOON, Ava, and TENASSERIM.—DISTRIB. Yunan, Indian Archipelago, Siam, New Guinea.

Stem terete, striate. *Leaves* 3–5 in. by 3–4½ in., glabrous, membranous, polymorphous, usually more or less angular and slightly lobed, base 7–9-nerved, cordate, lobes acute or acuminate, widely divergent; petiole 3–5 in. *Peduncles* 2½–4 in., solitary, axillary, dichotomous; pedicels puberulous, erect, ultimately spreading or recurved. *Flowers* rather crowded, secund, ebracteate. *Calyx* puberulous. *Corolla* slightly exceeding the calyx, whitish, deciduous. *Fruit* 1–1½ in. by 1¼ in.—The plant varies much in the consistence and form of the leaves, occasionally even on the same specimen, hence, by some writers, several species have been proposed. Baillon, however, ranks them all as varieties. The following occur within the limits of this Flora.

VAR. 1. *moluccana*, leaves rather thick subcordate or hastato-subcordate not lobed, nerves subpedate more or less conspicuous sometimes reddish, inflorescence cymose-racemose. C. moluccana, *Blume Rumph.* iii. 207, t. 177, f. 2; *Royle Ill.* 136; *Miq. Fl. Ind. Bat.* i. pt. i. 799. C. Rumphii, var. α integrifolia, *Baill. in DC. Prodr.* xvii. 26; *Rumph. Amb.* v. 482, t. 180. Dioscorea sativa, *L. Amœn. Acad.* iv. 133.

VAR. 2. *subhamata*, Baill. in DC. Prodr. xvii. 26; leaves cordate pedately 7-nerved sagittate-ovate, 5–7-lobed, terminal lobe largest ovate acuminate, lateral lobes angular acuminate, lowermost unequally cuneate. C. subhamata, *Wall. mss.*

There are differences of opinion as to the structure of the flower. The figure of the ovary in Blume's Rumphia, t. 177, f. 8, differs from the description, and is erroneous. The persistent and accrescent style (?) assumes a spongy cellular character, and is traversed by two bundles of spiral vessels and by laticiferous tubes. Octahedral crystals also abound in its tissues. The cells of the epicarp contain in some cases a spiral fibre. The structure of the ovule is very peculiar. According to Dr. Hooker's unpublished drawings made from the fresh specimens, the ovule is pendulous and originally straight, but afterwards curves upward. It is devoid of coats, but is provided with a raphe and the embryo sac (?) is protruded in the shape of a long tubular process.

ORDER XL. **ILICINEÆ.** (By J. D. Hooker.)

Shrubs or trees. *Leaves* alternate, simple, exstipulate, or with 2 minute stipules, usually coriaceous and evergreen. *Flowers* small, in axillary cymes fascicles or umbellules, usually diœcious, ♂ with imperfect ovary, and ♀ with imperfect stamens. *Calyx* 3–6-partite or -lobed; segments or lobes imbricate, persistent. *Petals* 4–5, rarely 6–8, connate at the base, or connate in the ♂ and free in the ♀, deciduous, imbricate. *Stamens* 4–5, adhering to the bases of the petals, sometimes free and hypogynous in the ♀, filaments subulate; anthers shortly oblong, dorsifixed. *Disk* 0. *Ovary* free, 3–16-celled; style 0, or very short, rarely long, stigma capitate or discoid; ovules 1, or 2 collateral, pendulous, raphe dorsal, micropyle superior, funicle often cupular. *Drupe* with 2 or more 1-seeded free rarely connate stones. *Seed* with a membranous testa, fleshy albumen and minute embryo.—DISTRIB. Three genera, and about 150 species, chiefly tropical.

An examination of the Indian species has led to very important modifications of the ordinal character as given in the Genera Plantarum, and to the suppression of the genus *Byronia.*

1. **ILEX,** Linn.

Calyx 4–5-lobed or -parted. *Corolla* rotate, petals free or connate at the base. *Stamens* 4–5, adhering to the base of the corolla in the ♂, sometimes hypogynous in the ♀. *Ovary* 2–12-celled; styles 0 or very short, stigmas free or confluent on the top of the ovary. *Drupe* globose, very rarely ovoid, with 2–16 stones.—DISTRIB. Of the Order; species about 145.

SECT. I. *Flowers* in strict spikes. *Drupe* with 10–16 stones.

1. **I. spicata,** *Blume Bijdr.* 1149; glabrous, leaves elliptic shortly obtusely caudate-acuminate very coriaceous quite entire. Prinos spicata, *Miq. Fl. Ind. Bat.* i. pt. 2, 594.

MALACCA, *Maingay.*—DISTRIB. Java, Borneo.

An often epiphytic shrub (*Blume*); branches stout, woody. *Leaves* 4–6 in., base rounded, midrib stout beneath, dark olive-green when dry; nerves very slender, reticulate; petiole very short. *Spikes* 1½ in., solitary or twin, axillary and below the leaves, suberect or spreading; rachis rather stout, flowering from the base; bracts minute, pedicel $\frac{1}{10}$ in. *Flowers* minute; ♂ about $\frac{1}{10}$ in. diam. *Calyx* flat, of 4–5 rounded lobes. *Corolla* of 4–5 broadly oblong petals, slightly connate at the base, finally reflexed. *Stamens* inserted at the junction of the petals, filaments at length longer than the corolla; anthers small. *Imperfect ovary* globose, grooved. *Fl.* ♀ not seen.

Drupe ⅓ in. long, broadly ovoid, much compressed, with a sessile transversely elongated stigma on its broad truncate end, and 10–16 minute compressed coriaceous stones.—A very curious plant, which I assume to be Blume's *I. spicata.* Maingay's specimens are in ♂ flowers only, and I have described the drupe from Bornean ones collected by Beccari.

Sect. II. *Flowers* in very dense short axillary branched cymes, pedicels very short, ♂ and ♀ 4-merous. *Drupes* subsessile in the axils, 1–4-celled (pedicelled in *I. odorata*).

2. **I. insignis,** *Hook. f.*; branches very stout, leaves 6–9 in. elliptic-lanceolate obscurely serrate very coriaceous young spinous-toothed, drupe subsessile large with a rugose 1–3-seeded stone.

Sikkim Himalaya; at Darjeeling, alt. 7000 ft.

A small evergreen erect tree; branchlets as thick as the little finger, grooved. *Leaves* very thick, acute, narrowed into the stout petiole, which is ¾–1 in.; nerves beneath very stout and much reticulated; young oblong-lanceolate, base rounded, margins spinous, petiole shorter. *Flowers* 4-merous, ⅓ in. diam., in subglobose clusters ½ in. diam., green; pedicels very short, stout; bracts opposite, small, ovate, acute. *Calyx-lobes* broadly ovate, acute or obtuse. *Petals* orbicular-obovate, connate below in the ♂. *Stamens* equalling the petals, inserted on the corolla in the ♂, filaments very thick. *Rudimentary-ovary* globose, with 4 minute papillæ as stigmas. *Ovary* of ♀ 4-celled; stigma sessile, discoid, 4-lobed. *Drupe* ⅔ in. diam., globose, with a globose 1–3-celled 1–3-seeded grooved woody stone formed of 4 connate stones.—Closely allied to *I. dipyrena,* but a very much larger plant in all its parts, with shorter stamens and a very different structure of the drupe. Still more closely allied to the Japanese *I. latifolia,* Thunb., which has 4 separate stones in the drupe.

3. **I. dipyrena,** *Wall. in Roxb. Fl. Ind. ed. Carey,* i. 473; *Pl. As. Rar.* iii. 68, t. 292; *Cat.* 4327; branches stout, leaves 3–4 in. elliptic-lanceolate spinous-serrate very coriaceous, the old quite entire, drupe subsessile with 2 rarely more plano-convex deeply-grooved stones. *Don Prodr.* 188; *DC. Prodr.* ii. 15; *Brandis For. Flor.* 76.

Temperate Himalaya; from Simla, alt. 5–8000 ft., to Sikkim, alt. 7–9000 ft., *Wallich,* &c.

An evergreen tree 30–40 ft.; trunk sometimes 17 feet girth; shoots pilose. *Leaves* shining, the young very spinous, the older with scattered marginal spines, the oldest with a thickened quite entire border; petiole ¼–⅓ in. *Flowers* 4-merous, ¼ in. diam., in axillary subglobose clusters, white; pedicels very short; bracts 2, opposite, ovate, acute. *Calyx-lobes* broadly ovate, acute, ciliate. *Petals* obovate, connate below in the ♂, free in the ♀. *Stamens* of ♂ inserted on the corolla, longer than the petals, of the ♀ hypogynous. *Ovary* of ♀ ovoid, 2- rarely 3–4-celled, stigma quadrate. *Drupe* ½ in. diam., globose, scarlet, stones usually 2, rarely 3–4, deeply grooved longitudinally.

4. **I. odorata,** *Ham. in Don Prodr.* 189; leaves 5–7 in. elliptic-oblong or lanceolate acute minutely serrate-toothed, ♂ fl. in short globose panicled cymes, female cymes shorter, drupe pedicelled with 4 stones. *DC. Prodr.* ii. 15; *Brandis For. Flor.* 77.—Ilex? *Wall. Cat.* 9023.

Temperate Himalaya; from Simla to Nipal, alt. 3–6000 ft.

A small evergreen tree; branches much less stout than in the preceding two species. *Leaves* sometimes 9 in.; nerves rather slender; petiole ⅓–⅔ in. *Flowers* 4-merous, about ⅓ in. diam., white; ♂ in very shortly peduncled spreading globose cymes ½–1 in. diam.; ♀ in shorter cymes and with shorter pedicels; bracts minute, at the base of the pedicels. *Calyx-lobes* rounded. *Petals* of ♂ connate below; of ♀ free, oblong, obtuse. *Stamens* of ♂ inserted on the corolla, filaments slender, much longer than the petals; of ♀ hypogynous. *Ovary* globose, 4-celled; stigma sessile quadrate. *Drupe* ¼ in. diam., pedicelled, globose (ovoid, black, *Brandis*); stones 4, small, trigonous, with obtuse angles.—Brandis gives Sikkim as a habitat for this, but I doubt the plant he here alludes to being the same species; his plant has very stout branches like those of *I. dipyrena*, and very shortly pedicelled young fruits, has 4 pyrenes, lanceolate minutely serrate leaves, and inhabits elevations of near 10,000 ft.; it may be a new species, but the specimens are too imperfect for determination.

SECT. III. *Flowers* ♂ in panicled cymes; ♀ solitary or fascicled, pedicelled (not cymose nor on peduncled umbellules). *Drupe* 4–6-celled. (See 15. *Gardneriana*, in Sect IV.).

* *Leaves quite entire, or with* 2–3 *spinulose teeth.* (*See* 9. embelioides.)

5. **I. malabarica,** *Bedd. Flor. Sylv.* t. 143; leaves 2–4-in. narrowly elliptic-oblong acute or apiculate quite entire, ♂ flowers in shortly panicled umbellules, calyx usually 6-merous, drupe very small puberulous usually 6-celled, style short cylindric stout. I. Wightiana, *Dalz. & Gibs. Bomb. Flor.* 143, *not of Wall.*

WESTERN PENINSULA; on the Ghats, from the Concan southwards, ascending to 3000 ft.

A large tree, everywhere quite glabrous. *Leaves* variable in length and breadth, always more or less narrowly elliptic, acute acuminate or apiculate by the produced nerve, shining above, nerves beneath faint, margin with rarely a spinulose tooth towards the tip; petiole ⅙–⅓ in. *Flowers* ⅒ in. diam., peduncles and pedicels puberulous; ♀ fl. solitary or fascicled, the fascicles very rarely peduncled, pedicels ¼–⅓ in. *Calyx-lobes* usually 6, broad, subacute, ciliate. *Petals* 4–6, orbicular, ciliolate, connate at the base in the ♂, less so in the ♀. *Stamens* often only 4, inserted at the base of the corolla, filaments short; anthers broadly oblong. *Ovary* of ♂ imperfect, with 4 minute stigmas. *Drupe* ⅛ in. diam., depressed-globose, usually 6- or more celled, with an evident stout style.—This has been distributed as *I. Wightiana*, by Perottet and others.

6. **I. Walkeri,** *Wight & Gard. mss. ex Thwaites Enum.* 184 (1858); glabrous, leaves ¾–1 in. subsessile orbicular obovate or broadly elliptic very coriaceous obtuse rounded or retuse with a few teeth near the tip, flowers 4–5-merous, ♂ in very shortly peduncled umbellules, ♀ shortly pedicelled. I. Walkeri, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, pt. i. 605. I. emarginella, *Turcz.* l.c.

WESTERN PENINSULA; Pulney Mts., *Wight.* CEYLON; in the Central province, alt. 5–8000 ft.

A small densely branched tree. *Leaves* very coriaceous, usually obovate with an emarginate or 2-lobed or 3–4-toothed tip, margins recurved, nerves below few and slender; petiole ⅒ in. *Flowers* ⅒ in. diam., white, 4–5-merous. *Calyx-lobes* 4–5, subacute. *Petals* orbicular, spreading, connate in both sexes. *Stamens* 4–5, inserted on the corolla in both sexes. *Drupe* ⅙ in. diam., globose, with 4–5 triangular hard cohering stones; stigma sessile, 4–5-lobed.—A very variable plant, named *Walkeri* independently by Thwaites and Turczaninoff. Thwaites has a var. *major* with elliptic apiculate leaves. Turczaninoff's *I. emarginella* is the more common form of the plant.

** *Leaves toothed or serrate.* (*See also* 6. Walkeri.)

7. **I. denticulata,** *Wall. Cat.* 4333; glabrous, leaves 2½–3 in. elliptic or elliptic-oblong acute or obtusely acuminate serrate very coriaceous, flowers 4-merous, ♂ in short subsessile cymes, ♀ fascicled, drupe ⅓ in. diam. with 4 hard stones. *Wight Ill.* t. 142; *Thwaites Enum.* 183; *Beddome Fl. Sylv.* t. 142. I. nilagirica, *Miquel Pl. Hohen.* 1456.

WESTERN PENINSULA; Nilghiri and Anamallay hills, alt. 6–8000 ft., *Wight,* &c. CEYLON, on the Bopatalawa Plains, alt. 6000 ft., *Thwaites.*

A large timber tree (*Beddome*); young parts minutely pubescent. *Leaves* very coriaceous, acutely or obtusely serrate throughout their length, tip variable, very coriaceous; nerves beneath few, very slender; petiole ½–¾ in. *Flowers* ⅙ in. diam.; ♂ in branched very short cymes. *Calyx-lobes* broad, subacute. *Petals* connate at the very base in the ♂, free in the ♀, broadly oblong. *Stamens* about equalling the petals, inserted on the corolla in the ♂, hypogynous in the ♀. *Drupes* rarely solitary, globose, with 4 trigonous grooved rather woody stones; stigma sessile, 4-lobed; pedicels very stout, ⅓ in. long.—Wight figures the ovarian cells with 2 superposed ovules (copied in Beddome's Flor. Sylv.); I find but one with a large thick funicle. I have followed Wight and all subsequent authors in calling this *I. denticulata*, Wall.; but the only representatives of this name in the Wallichian Herbarium are two small obovate leaves, with obscurely serrate margins, probably of *I. Wightiana.*

8. **I. theæfolia,** *Wall. Cat.* 6391 (Myrsine); glabrous, branches robust, leaves 2–3½ in. elliptic-oblong or lanceolate subcaudate with an obtuse tip obtusely obscurely serrate very coriaceous reticulate beneath, flowers 5-merous, ♂ in very short subsessile cymes, ♀ fascicled, drupe ¼ in. diam. with 4 stones. I. gaultheriæfolia, *Kurz in Beng. As. Soc. Jour.* 1872, ii. 259.

KHASIA MTS., alt. 3–4000 ft., *Gomez*, &c.; TENASSERIM, *Kurz;* MISHMI HILLS, *Griffith.*

So near to *I. denticulata*, that I have hesitated before keeping it distinct; it differs in the longer narrower more attenuate tips of the leaves, with more reticulated nerves beneath, and in the smaller drupes. I have adopted Wallich's singularly appropriate specific name.

9. **I. embelioides,** *Hook. f.;* glabrous, leaves 1½–2 in. elliptic or elliptic-lanceolate caudate-acuminate with an obtuse apiculate tip entire or with a few acute serratures, flowers 4-merous minute, ♂ in small pedicelled umbellules, ♀ fascicled, drupe ⅛ in. globose with 4 stones.

KHASIA MTS.; common at Churra, Nunklow, &c., alt. 3–4000 ft.

A small tree; tips of branchlets obscurely puberulous, as is sometimes the midrib of the young leaf above. *Leaves* coriaceous, sometimes quite entire, at others with small scattered spinulose teeth along the margin, very obscurely reticulated beneath; petiole ¼–⅓ in. *Flowers* about $\frac{1}{12}$ in. diam., white; ♂ panicles ½–1 in., peduncles slender, pedicels obscurely puberulous. *Calyx-lobes* obtuse. *Petals* oblong-orbicular, connate below in both sexes. *Stamens* equalling the petals, inserted on the corolla in both sexes. *Drupes* clustered on a very short axillary branchlet, pedicels as long as themselves.—A very distinct species, of which a specimen in Griffith's Herbarium from the Khasia is labelled "Emheliæ affinis? Mambrea 12-6 35," apparently in Wallich's handwriting.

10. **I. Griffithii,** *Hook. f.;* branches pubescent or glabrescent, leaves 1½–2 in. elliptic acute serrulate coriaceous shining above, flowers 4-merous, ♂ fascicled, ♀ solitary or nearly so, drupe globose with 4 large coriaceous 3-gonous stones and a thin epicarp.

ASSAM, *Jenkins, Griffith;* SILHET, at Terrya Ghat, *H. f. & T. T.;* MALACCA, Keddah Peak, *Low;* Summit of Goonong, &c., *Maingay, Griffith.*

A small tree, branches very sparingly pubescent in Khasia specimens, much more so in those from Malacca. *Leaves* coriaceous, but soft, serratures obtuse, midrib below often pubescent; nerves numerous very fine; petiole ¼ in. *Flowers* ♀ nearly ¼ in. diam., larger than in *I. theæfolia*, ♂ nearly ⅕ in. diam., apparently not panicled; pedicels ¼ in. *Calyx* orbicular with 4 broad shallow ciliolate lobes. *Petals* broadly oblong, obtuse, recurved, connate below in both sexes. *Stamens* of ♂ equalling the petals, inserted on the corolla in both sexes. *Ovary* globose; stigma sessile, 4-lobed. *Drupe* quite globose, black or purple? flesh very thin, stones coriaceous with broad flat faces and a convex back; pedicel stout, ½–¾ in. long.

11. **I. Thomsoni,** *Hook. f.;* a small shrub, branchlets puberulous, leaves ½–1 in. obovate or oblanceolate subacute or apiculate serrulate coriaceous gland-dotted beneath, flowers 4-merous, ♂ solitary and in 3–5-flowered cymes, ♀ subsolitary, drupe globose ¼ in. diam. with 4 large coriaceous 3-gonous stones.

Eastern Himalaya; Bhotan, at Tongse, *Griffith.* Khasia Mts., alt. 4–5000 ft., at Moflong, *Wallich;* Churra and Surureem, *H. f. & T. T.*

A small bright green shrub, about 6 ft. high. *Leaves* shining, green, retaining their colour when dry, narrowed into the short petiole, serratures obtuse; nerves very obscure beneath. *Flowers* about ⅙ in. diam., white; cymes of ♂ of usually 3 flowers on a peduncle ¼–⅓ in. long; pedicels slender; ♀ pedicels ⅙ in., lengthening and thickening in fruit. *Calyx* with 4 orbicular lobes. *Petals* broadly oblong, obtuse, connate at the base in both sexes. *Stamens* as long as the petals, inserted on the corolla in both sexes. *Drupe* like that of *I. Griffithii,* but smaller, purple; stigma sessile, 4-lobed.—This was first gathered by Wallich at Moflong in 1835, when on the tea-deputation to Assam. Very near, indeed, to *I. Horsfieldii,* Miq., of Java, but the leaves are obovate; both have leaves of similar texture and serrature, and gland-dotted beneath.

12. **I. intricata,** *Hook. f.;* branches straggling with warted ridges, leaves ⅓–½ in. obovate obtuse coarsely serrate very coriaceous, flowers subsolitary 4-merous, ♂ shortly pedicelled, ♀ sessile, drupe ¼ in. diam. with 4 large 3-gonous stones.

Sikkim and East Nipal Himalaya, alt. 10–11,000 ft., *J. D. H.*

A low rigid straggling shrub, forming matted masses with interlaced woody branches; branchlets stout, angled and rigid, the ridges warted. *Leaves* spreading, thickly coriaceous, bright green, narrowed into very short petioles; nerves few beneath, raised. *Flowers* $\frac{1}{10}$ in. diam. *Calyx-lobes* orbicular. *Petals* broadly oblong, coriaceous, nearly free below in the ♀, spreading. *Stamens* equalling the petals, shorter in the ♀, and hardly adherent to the petals at the very base. *Drupes* sessile, red, globose, stigma sessile 4-lobed, flesh thin, of the same structure as those of *I. Thomsoni* and *Griffithii,* to which this species is clearly allied.

13. **I. fragilis,** *Hook. f.;* glabrous, leaves 4–5 in. elliptic or ovate subcaudate-acuminate serrulate membranous, flowers 5-merous all fascicled, drupe ⅕ in. with 5–8 stones.

Sikkim and Bhotan Himalaya, alt. 7–10,000 ft., *Griffith.* Khasia Mts. at Surureem, alt. 5000 ft., *H. f. & T. T.*

A small tree, with very brittle branches, quite glabrous. *Leaves* bright deep green, more membranous than in any of the Indian species, very strongly reticulate with many raised nerves beneath; petiole ½–⅔ in. *Flowers* ⅙ in. diam., both ♂ and ♀ fascicled; pedicels ⅓–⅙ in., glabrous. *Calyx-lobes* rounded-oblong. *Petals* spreading, broadly oblong, obtuse, united at the base in both sexes. *Stamens* shorter than the petals, filaments stout, inserted on the corolla in both sexes. *Drupes* ⅙ in. diam., on short stout pedicels, fleshy, red, globose, stigma rather large and tumid, stones thickly coriaceous.

Sect. IV. *Female flowers* in simple or branched peduncled umbellules. *Leaves* quite entire in all. (See various species in § V.)

14. **I. venulosa,** *Hook. f.;* quite glabrous, leaves 5–8 in. elliptic-oblong with long slender caudate points quite entire much reticulated, umbellules simple and panicled, ♂ flowers 4- ♀ 5–6-merous, drupe very small, stigma tumid subsessile.

Khasia Mts., in woods, alt. 4–5000 ft., *De Silva,* &c.

A handsome tree. *Leaves* shining above, pale beneath, with many spreading strong branching nerves, suddenly contracted at the apex into a tail sometimes almost 2 inches long, base rounded; petiole $\frac{1}{2}$–1 in. Male fl. in glabrous axillary branched cymose umbellules, $\frac{1}{10}$ in. diam., greenish-white; peduncle compressed, stout, $\frac{1}{2}$–1 in.; pedicels $\frac{1}{4}$ in., slender. *Calyx-lobes* rounded. *Petals* broadly oblong, connate in both sexes. *Stamens* short, inserted on the corolla in both sexes. Female fl. umbellules in shorter stouter simple or much-branched peduncles. *Drupes* red, crowded; pedicels of about their own diameter; stones 5–6, trigonous, with convex backs, rather thick.—A very distinct and handsome species.

15. **I. Gardneriana,** *Wight Ic.* t. 1217; glabrous, leaves 2–2$\frac{1}{2}$ in. long-petioled ovate-lanceolate caudate-acuminate quite entire, umbellules simple and panicled, flowers 5-merous.

Western Peninsula; on the Nilghiri hills at Sisparah Ghat, *Wight.*

A small tree or large shrub (*Wight*). *Leaves* rather coriaceous, base rounded; nerves very faint beneath; petiole $\frac{1}{2}$–$\frac{3}{4}$ in., very slender. *Flowers* $\frac{1}{8}$ in. diam., male only seen, in simple solitary or fascicled peduncled slightly pubescent umbels; peduncles shorter than the petioles; pedicels slender, $\frac{1}{4}$ in. *Calyx-lobes* broad, ciliolate. *Petals* oblong, obtuse, connate below. *Stamens* of ♂ equalling the petals, inserted on the corolla in both sexes.—A very distinct species, of which the fruit is unknown.

16. **I. Wightiana,** *Wall. Cat.* 4332; glabrous, leaves 1$\frac{1}{2}$–4$\frac{1}{2}$ in. elliptic elliptic-oblong or -ovate subacute or acuminate quite entire softly coriaceous, flowers usually 5–6-merous, ♂ and ♀ in peduncled simple panicled puberulous umbellules, drupe with 5–6 stones, stigma subsessile. *Wight Ic.* t. 1216; *Thwaites Enum.* 183; *Bedd. Fl. Sylv.* t. 142.

Western Peninsula; Nilghiri hills, *Wight*, &c.; Ceylon, in the southern and central parts, ascending to 4000 ft., *Thwaites.*

A large umbrageous tree, trunk 6 ft. in diam. at as high above the ground (*Wight*). *Leaves* coriaceous, much larger in Ceylon than in Peninsular specimens, and more reticulated with rather distant nerves beneath, narrowed into a petiole $\frac{1}{4}$–$\frac{1}{3}$ in. long. *Flowers* minute, $\frac{1}{10}$ in. diam., white, umbellules subsessile in Peninsular specimens, on peduncles $\frac{1}{3}$–$\frac{1}{2}$ in. long in Ceylon specimens. *Calyx-lobes* orbicular. *Petals* oblong, connate below in both sexes. *Stamens* of ♂ shorter than the petals, united to the corolla in both sexes. *Drupe* $\frac{1}{4}$ in. diam., globose, smooth, stones with flat sides and convex backs; style very short indeed.—The differences between the Peninsular and Ceylon specimens are almost specific.

Var. *peninsularis;* leaves 1–2$\frac{1}{2}$ in., nerves very indistinct beneath, umbellules subsessile.

Var. *zeylanica;* leaves 3–5 in., nerves very distinct beneath, umbellules pedicelled.

17. **I. excelsa,** *Wall. Cat.* 4328 (exsulca); glabrous, leaves 2–4 in. soft elliptic-ovate or -lanceolate acuminate quite entire, nerves very oblique, petiole slender, umbellules pubescent very shortly and stoutly peduncled, flowers 4–5-merous, drupe $\frac{1}{6}$ in. diam. with 5 stones. *Brandis For. Flor.* 76 (*excl. syn.* Ehretiæ). ? I. elliptica, *Don Prodr.* 189. Cassine excelsa, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 376.

Subtropical Himalaya; from Kumaon to Nipal and Bhotan (exclusive of Sikkim), alt. 4–6000 ft.; Khasia Mts., alt. 4000 ft., *Griffith*, &c.

A large shrub (or tall tree, *Wallich*). *Leaves* dark-green, shining above, paler beneath, rather fleshy, base acute; petiole $\frac{1}{2}$–1 in.; stipules 2, minute. *Flowers* $\frac{1}{8}$ in. diam., about 12 in an umbel; peduncle $\frac{1}{4}$–$\frac{1}{2}$ in., stout, compressed; pedicels stout, very short. *Calyx-lobes* ovate, obtuse, ciliate. *Petals* ovate-rotundate, crenulate, united at the base in both sexes. *Stamens* equalling the petals, inserted on the corolla in both sexes, filaments dilated at the base. *Drupe* globose, with 4–5 trigonous stones; stigma 4–5-lobed.—That the trivial name *exsulca* of Wall. Cat. is an oversight for *excelsa* is evident from this being the *Cassine excelsa* of Wallich in Roxburgh's Flora Indica, where it is admirably described and stated to be a lofty tree; no less than from the fact that the mss. ticket attached to Blinkworth's specimens in Wallich's handwriting, bears the name *excelsa.* Brandis is certainly mistaken in referring the *Ehretia umbellulata*, together with various Malayan Peninsula specimens, to this species. Wallich describes the flower as inodorous, Brandis as sweet-scented. Very near if not identical with *I. rotunda*, Thunb., of Japan.

18. **I. Godajam,** *Colebr. ms. ex Wall. Cat.* 4329; branchlets pubescent, leaves 3–5 in. soft ovate acute or with a retuse tip quite entire nerves spreading, petiole slender, umbellules pubescent on simple or branched peduncles, ♂ flowers 4–5-merous. Ehretia umbellulata, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 344; *Cat.* 4329. Pseudehretia umbellulata, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, pt. i. 607.

EASTERN BENGAL, ASSAM, and SILHET; Jilpigoree (*Hamilton in Herb. Wall.*); foot of Sikkim hills, *J. D. H.*

A branching tree; bark pale, ashy. *Leaves* rather membranous, soft, undulate, nerves very slender; petiole slender, $\frac{1}{2}$–1 in.; stipules 2, minute. *Flowers* (♂ only seen) $\frac{1}{3}$–$\frac{1}{6}$ in. diam., in simple or panicled peduncled umbellules, which, as well as the peduncles and very short pedicels, are more or less pubescent, fragrant. *Calyx-lobes* orbicular. *Petals* ovate-oblong, shorter than the slender filaments, urited below.—It is remarkable that of the five collectors from whom I have specimens of this plant, not one has obtained the female flowers or fruit. One of Wallich's specimens has the flowers almost twice as large as and more pubescent than the others, and may be a different species. I have the same from the Garrow hills, gathered by Simons.—This differs much from *I. excelsa*, in the foliage, longer peduncles, and more numerous flowers, and may prove the same with *I. sulcata*, Wall.

19. **I. sulcata,** *Wall. Cat.* 4330; glabrous, leaves 4–6 in. soft elliptic-lanceolate or -oblong or -ovate obtuse quite entire membranous, petiole slender, umbellules solitary simple long-peduncled puberulous, flowers 4–6-merous, drupe with about 8 trigonous stones.

TENASSERIM, at Moulmein, *Wallich;* Mergui, *Griffith;* Amherst, *Helfer* (Kew distrib. 1998); PEGU, *Kurz.*

Probably a tree; bark of branches grey-brown; shoots apparently soft. *Leaves* thin and soft in texture, pale yellow-brown when dry, with a slender translucent margin; nerves beneath very slender, arching, bardly reticulate; petiole $\frac{1}{2}$–$\frac{3}{4}$ in. *Umbellules* 12–20-flowered, more or less puberulous, always solitary and simple; peduncle 1 in., often shorter in the ♀, compressed; pedicels $\frac{1}{4}$ in. *Flowers* about $\frac{1}{10}$ in. diam. *Calyx-lobes* orbicular. *Petals* broadly oblong, obtuse, recurved, 4 in the ♂ and connate below, 6 in the ♀ and free, shorter than the slender filaments. *Rudimentary-ovary* conical, subtended by the obtusely 6-lobed calyx. *Drupe* $\frac{1}{5}$ in. diam., globose; stones trigonous, with the back, I think, concave, whence probably Wallich's name of *sulcata*, but I cannot well determine this point; stigma quite sessile, lobed —Perhaps the same as *I. Godajam*, Colebr. Very similar in foliage to *I. cymosa*, Blume, but the umbellules are simple, and bark of a very different colour.

SECT. V. *Female flowers* in branched peduncled cymes, rarely in simple umbellules. *Leaves* quite entire in all. (This differs from Sect. IV. in the umbellules being more broken up into cymules.)

20. **I. macrophylla,** *Wall. Cat.* 4331; quite glabrous, leaves 4–7 in. elliptic-oblong obtuse quite entire rather coriaceous, nerves beneath few strong ascending, flowers in branched peduncled cymes 4–6-merous, drupe small with about 8 stones.

EASTERN PENINSULA; Penang, *Phillips, Wallich;* MALACCA, *Griffith, Maingay.* ? TENASSERIM, *Helfer*, and Mergui, *Griffith* (Kew distrib. 2012).—DISTRIB. Java, Sumatra.

A tree about 15 ft. high (*Maingay*). *Branches* stout, bark grey; shoots quite glabrous. *Leaves* rigid, light brown when dry, shining above, paler beneath, with about 6–8 rather distant prominent ascending nerves, sparingly reticulated; petiole short, stout, ¼–⅓ in. *Cymes* more or less effuse, with short subscorpioid many-flowered branches; peduncles ¼–¾ in., rather slender, glabrous or minutely puberulous; pedicels as short as the flowers, sometimes umbellulate. *Calyx-lobes* orbicular. *Petals* broadly oblong, obtuse, rather shorter than the stamens; of the ♂ 4–6, united at the base, of ♀ often 6, unequal and free. *Stamens* inserted on the corolla in the ♂, hypogynous in the ♀. *Drupe* of two forms; one perfect, globose, ¼ in. diam., with a sessile stigma and 6–8 much compressed acutely 3-gonous stones; the other (imperfect) smaller, with a distinct but very short style and empty cells.—The Tenasserim specimens doubtfully referred to this species have smaller very coriaceous leaves, 2–3 in., with more narrowed bases and tips, and glabrous cymes. A specimen of apparently the same plant is amongst Maingay's Malacca collections, its fruit is unknown.

21. **I. Maingayi,** *Hook. f.*; quite glabrous, leaves 4–5 in. elliptic or narrowly elliptic-oblong obtusely acuminate very coriaceous rather glaucous beneath, nerves nearly horizontal, flowers subumbellate in stout much branched cymes 4–6-merous, drupe ⅕ in. diam. with 6 stones, style distinct.

PENANG, *Maingay* (Kew distrib. 1021).

A tree about the size of a Guava (*Maingay*); branches woody, bark dark grey, shoots quite glabrous. *Leaves* very coriaceous, dark brown opaque and subglaucous beneath when dry, blacker brown and shining above, midrib stout, narrowed into a stout petiole ¼–½ in. *Cymes* almost racemose, 1–2 in. long, peduncle and pedicel stout quite glabrous, black when dry. *Flowers* crowded on very short stout pedicels, $\frac{1}{10}$ in. diam.; ♀ cymes very short judging from the fruit. *Calyx-lobes* orbicular, not ciliate. *Petals* rather coriaceous, broadly oblong, in the ♂ 4, rather shorter than the stout filaments; in the ♀ 6, inserted below the ovary free. *Stamens* inserted on the corolla in the ♂, hypogynous in the ♀. *Drupes* on stout pedicels shorter than themselves, subtended by the 6-lobed calyx, rather longer than broad; pulp very scanty; stones trigonous, thickly coriaceous; stigma tumid, subsessile.—Near *I. macrophylla*, but the nerves of the leaf are more numerous and almost horizontal.

22. **I. cymosa,** *Blume Bijdr.* 1149; branches with white bark, leaves 3–5 in. elliptic or elliptic-oblong obtuse or obtusely acuminate rather membranous, nerves beneath very slender, flowers in lax open cymes 4–8-merous, drupe ⅛ in. diam. with about 8 trigonous stones, style stout distinct. I. singapuriana, *Wall. Cat.* 6526. Prinos cymosa, *Hassk. Tijdschr. Nat. Gesch.* x. 140; *Miquel Fl. Ind. Bat.* i. pt. 2, 595. Leucoderis javanica, *Planch. mss.*

EASTERN PENINSULA; from Tenasserim to Malacca, common.—DISTRIB. Sumatra, Java, Borneo.

A small tree; quite glabrous; bark of branches snow-white, with the epidermis flaking off. *Leaves* usually membranous, variable in shape; nerves few or many, spreading, very slender, sometimes quite faint, pale brown when dry, shining above, narrowed into a rather stout petiole ¼–⅓ in. long. *Flowers* $\frac{1}{12}$ in. diam., in small cymes or irregular umbellules which are collected into a spreading cymose long-peduncled panicle; peduncle ½–1½ in.; pedicels slender ¼ in.; ♂ 4–5-merous, with equal oblong obtuse spreading petals; ♀ with a 5-merous calyx and 6–8 unequal small erect concave petals. *Calyx-lobes* orbicular. *Drupe* ⅛ in. diam., rather longer than broad, grooved when dry, with very little flesh, and usually 8 trigonous compressed stones; stigma on an evident stout short style.—The white bark is very conspicuous in this plant, which has a more open panicled cyme and longer style than any of its Indian congeners.

23. **I. Wallichii,** *Hook. f.*; branches with white bark, leaves 4–5 in. elliptic or elliptic-ovate obtuse quite entire thinly coriaceous, drupe ⅓ in. diam. with about 12 compressed stones, stigma sessile. Ilicinea?, *Wall. Cat.* 9012.

TENASSERIM; at Tavoy, *Gomez.*

Branches woody; bark as in *I. cymosa*, but apparently less inclined to flake. *Leaves* brown when dry, pale beneath, with about 10 pair of very faint-spreading nerves, narrowed into a petiole ⅓ in. long.

24. **I. sclerophylla,** *Hook. f.;* leaves 5–6 in. elliptic-oblong obtuse quite entire glaucous beneath thickly coriaceous, petiole short very thick, cymes ♀ short with a very stout peduncle and pedicels.

MALACCA, on Mt. Ophir, *Griffith.*

A very remarkable species, of which I have seen only two fragments. The leaves are polished above, extraordinarily thick, narrowed into a very thick petiole ½ in. long. *Cyme* 1 in., sparingly branched, branches apparently 3-flowered; pedicels ¼ in. *Flowers* ♀ only with the corolla. *Calyx* of 5 short rounded ciliolate lobes. *Petals* many, very small, unequal, free. *Ovary* ovoid, truncate; stigma sessile.

UNKNOWN SPECIES.

I. DAPHNEPHYLLOIDES, Kurz in Journ. As. Soc. Beng. 1870, ii. 72, from Tongloo in Sikkim, is described as 10-androus and hence cannot be an Ilex.

I. ASIATICA, *Linn. Sp. Pl.* 125. This is undeterminable; no specimen exists in the Linnean Herbarium.

ORDER XLI. CELASTRINEÆ. (By M. A. Lawson, F.L.S.)

Trees or shrubs, erect or climbing. *Branches* sometimes spinescent. *Leaves* opposite or alternate, usually coriaceous, simple, petioled, rarely subsessile; stipules caducous or 0. *Flowers* hermaphrodite or polygamous, usually cymose. *Calyx* small, 4–5-lobed, imbricate, persistent. *Petals* 4–5, rarely 0, inserted below the disk or continuous with its margin, imbricate. *Stamens* 3–5, rarely 2, filaments subulate or flattened; anthers 2-celled. *Disk* usually conspicuous, pulvinate or flattened, lobed or entire, rarely 0. *Ovary* sessile, the disk free at the base or confluent with it, 3–5-celled; style short or 0, stigma triangular rarely 3-partite; ovules 2 in each cell, anatropous, erect, rarely 1 and pendulous, or many ascending attached to the axis; raphe in those ascending ventral, in those which are pendulous dorsal. *Fruit* capsular, baccate, drupaceous or samaroid. *Seed* arillate rarely exarillate, sometimes winged, albumen fleshy or 0; embryo usually large, cotyledons foliaceous flat.—DISTRIB. Species about 400, scattered over the tropical and temperate regions of the whole world.

TRIBE I. **Celastreæ.** *Stamens* 4 or 5, rarely more, inserted on or beneath the margin of the conspicuous disk; filaments subulate, often incurved. *Seed* (*Kokoona* excepted) albuminous.

SUBTRIBE I. EUONYMEÆ. *Leaves* opposite (rarely alternate in *Lophopetalum*).

* *Fruit* a capsule, dehiscent.

a. *Ovules* 1–2 *in the axis of each cell.*

Petals free, efoveolate. Ovules 2 in each	1. EUONYMUS.
Petals free, 2-foveolate. Ovules 1 in each cell, pendulous . .	2. GLYPTOPETALUM.
Petals connate, efoveolate, rarely 0. Ovules 2 in each cell .	3. MICROTROPIS.

b. *Ovules* 4 *or more in each cell.*

Ovary 3–4-celled. Seeds arillate, rarely winged, albuminous .	4. LOPHOPETALUM.
Ovary 3-celled. Seeds exarillate, winged, exalbuminous . .	5. KOKOONA.

** *Fruit* indehiscent.

Ovules 2 in each cell, erect. Fruit coriaceous, 1–2-celled . . 6. Pleurostylia.

Subtribe II. Celastreæ. Leaves alternate. Ovules 2 in each cell, erect. Fruit dehiscent.

Ovary free. Seeds arillate. Shrubs, usually scandent; flowers paniculate or racemose . . . . 7. Celastrus.
Ovary confluent with the disk. Erect shrubs or trees, often spinose; flowers cymose . . . . 8. Gymnosporia.
Ovary free, surmounted by a tuft of hairs, styles 2. Flowers in simple or panicled racemes . . . . 9. Kurrimia.

Subtribe III. Elæodendreæ. Leaves opposite or subopposite. Fruit a dry or pulpy drupe.

Ovary confluent with the disk, flowers cymose. Seeds exarillate . . . . 10. Elæodendron.

Tribe II. **Hippocrateæ.** *Stamens* 3, rarely 2, 4 or 5, inserted on the face of the disk. *Filaments* flattened, sometimes adnate to the ovary, recurved and causing the anthers when dehiscing to become extrorse. *Seed* exalbuminous.—*Leaves* opposite except in *Siphonodon.*

Fruit flattened, dehiscent. Seeds winged. Scandent shrubs; leaves opposite . . . . 11. Hippocratea.
Fruit a berry. Seeds not winged. Erect shrubs; leaves opposite . . . . 12. Salacia.
Fruit indehiscent. Seeds not winged; leaves alternate . . 13. Siphonodon.

1. EUONYMUS, Linn.

Trees or shrubs, erect rarely scandent, glabrous. *Leaves* petioled, rarely subsessile; stipules caducous. *Calyx* 4–5-fid, spreading or recurved. *Petals* 4–5. *Stamens* 4–5, inserted on the disk; anthers broad, 2-celled. *Disk* large, fleshy, 4–5-lobed. *Ovary* sunk in the disk, 3–5-celled; style short or 0, stigma 3–5-lobed; ovules 2 in each cell, attached to the inner angle, ascending and suspended. *Capsule* 3–5-celled, 3–5-lobed, angled or winged, coriaceous, rarely echinate; cells 1–2-seeded, loculicidal. *Seeds* covered by the aril, albuminous.—Distrib. Species about 40; natives of the mountainous regions of Tropical Asia and the Malayan Archipelago, a few also scattered over Europe and North America.

Sect. I. *Peduncles* 1–3-flowered.

* *Flowers usually 5-merous. Petals fimbriate.*

1. **E. javanicus,** *Blume Bijdr.* 1146; peduncles 1-flowered fascicled. *Benn. Pl. Jav. Rar.* 130, t. 28. E. sumatranus, *Miq. Fl. Ind. Bat. Suppl.* i. 512. E. sphœrocarpus, *Hassk. Cat. Pl. Hort. Bog.* 229.

Eastern Peninsula; from Tenasserim to Penang and Malacca.—Distrib. Sumatra, Java.

A tree 30–40 ft. *Leaves* 4–6 by 1½–2½ in., thick and coriaceous, oblong, elliptic or elliptic-oblong, acute or subacuminate, entire or obscurely crenate-serrate towards the apex. *Peduncles* ¾–1¾ in., terete. *Petals* oblong, about ¼ in. *Fruit* ¾ in., obovate-clavate.—*E. sumatranus*, Miq., has fruit 1 in. or more long, but in all other respects it resembles *E. javanicus.*

2. **E. indicus,** *Heyne in Roxb. Fl. Ind. ed. Carey*, ii. 409; peduncles 1–3-flowered solitary or geminate. *Wall. Cat.* 4290; *W. & A. Prodr.* 160. E. Goughii, *Wight Ill.* i. 178; *Ic.* t. 215; *Dalz. & Gibs. Bomb. Fl.* 47; *Bedd. Fl. Sylv. Anal. Gen.* lxiii.

Western Peninsula; on the Ghats from the Concan southward.

A shrub or small tree. *Leaves* 3–4 by $1\frac{1}{4}$–$2\frac{1}{4}$ in., subcoriaceous, ovate or lanceolate-oblong, entire or obscurely serrate at the apex. *Peduncles* $\frac{1}{4}$–2 in., cylindric, stoutish. *Petals* nearly orbicular, about $\frac{1}{4}$ in., rust-coloured. *Fruit* $\frac{3}{4}$ in., obovoid-clavate.

** *Flowers usually* 5-*merous. Petals entire.*

3. **E. revolutus,** *Wight Ill.* i. 178; leaves $1\frac{1}{2}$–2 by $\frac{3}{4}$–$1\frac{1}{2}$ in. ovate or roundish to obovate very coriaceous margins revolute, peduncles 1–3-flowered usually geminate, petals $\frac{1}{6}$ in. orbicular flat. *Thwaites Enum.* 73; *Bedd. Fl. Sylv. Anal. Gen.* lxiv.

Ceylon; at Newera Ellia, ascending to 6000 ft.

A small glabrous tree with subquadrangular shoots. *Leaves* rounded at the apex, entire or obscurely serrate at the apex. *Peduncles* $\frac{1}{4}$–1 in. cylindrical. *Flowers* bright red. *Fruit* $\frac{1}{2}$ in., turbinate.

4. **E. crenulatus,** *Wall. Cat.* 4297; leaves 2–3 by 1–$1\frac{1}{2}$ in. elliptic-oblong to subovate coriaceous margins revolute, peduncles 3- or more-flowered, solitary, petals $\frac{1}{8}$ in. orbicular flat. *W. & A. Prodr.* 161; *Wight Ic.* t. 973; *Bedd. Fl. Sylv.* t. cxliv.

Western Peninsula; Nilghiri hills, *Wight, &c.*

A small glabrous tree; young branches slightly compressed. *Leaves* crenulate-serrate towards the apex. *Peduncles* 1 or more in., compressed, usually 3-flowered, but sometimes twice divided and 7-flowered. *Petals* rust-coloured. *Fruit* $\frac{1}{2}$ in., turbinate.—Very nearly allied to the last species, of which it may prove to be a variety.

5. **E. Thwaitesii,** *Laws.*; leaves $1\frac{1}{2}$ by $\frac{3}{4}$ in. broadly lanceolate subovate acute or blandly subacuminate subcoriaceous margins flat or wrinkled, peduncles 1 in. filiform solitary 3-flowered, petals $\frac{1}{6}$ in. orbicular with undulate margins.

Ceylon; alt. 2000 ft., *Walker, Thwaites.*

A small tree with twiggy branchlets and rough dark bark. *Leaves* entire. *Fruit* $\frac{1}{2}$ in., obovoid, clavate.

6. **E. Walkeri,** *Wight Ill.* i. 178; leaves $1\frac{1}{2}$–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in. lanceolate to ovate or acuminate subcoriaceous margins flat, peduncles 1-flowered sessile or in subsessile cymes $\frac{1}{5}$–$\frac{1}{4}$ in. in the axils of the upper leaves, petals $\frac{1}{12}$ in. orbicular with undulate margins. *Thwaites Enum.* 73; *Bedd. Fl. Sylv. Anal. Gen.* lxiv. E. zeylanicus, *Moon Cat.* 17.

Ceylon; ascending to 3000 ft.

A small tree. *Leaves* crenate-serrate towards the apex. *Peduncles* slender. *Flowers* almost sessile, exceedingly small. *Fruit* turbinate.—Small-leaved specimens of this species closely resemble *E. dichotomous*, and it is possible that Wight in describing the inflorescence as dichotomously branched may have confounded the two.

*** *Flowers* 4-*merous.*

7. **E. grandiflorus,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 404; *Cat.* 4282; *Tent. Fl. Nep.* 41, t. 30; *Pl. As. Rar.* iii. 35, t. 254; peduncles 2–3 in. slender. E. lacerus, *Ham. in Don Prodr.* 191; *DC. Prodr.* ii. 5. Lophopetalum grandiflorum, *Arn. in Ann. Nat. Hist.* iii. 151. L. lucidum, *Wight mss.*

Western Temperate Himalaya; from Kumaon, alt. 3000 ft. to Nepal. Khasia Mts., alt. 4–6000 ft., *Griffith, &c.*

A small branching tree, 12 ft. *Leaves* 3–4 in., obovate to obovate-oblong, rounded finely and acutely serrate at the apex, shining and dark green above, pale beneath, almost black when dry. *Peduncles* 3 in., slender, 3-flowered. *Flowers* $\frac{4}{5}$ in. across. *Petals* white, nearly orbicular. *Fruit* $\frac{1}{2}$ in., globose with 4 rounded angles yellow. *Seeds* black, shining, with a scarlet aril. — A very elegant plant both in flower and fruit.

VAR. Leaves $1\frac{1}{2}$ by $\frac{1}{4}$ in., oblong-lanceolate, flowers smaller—perhaps a distinct species. Bhotan, *Griffith.*

8. **E. calocarpus,** *Kurz in Journ. As. Soc. Beng.* 1872, pt. ii. 299; peduncles 1 in. or less stout.

TENASSERIM, *Helfer.*

A shrub? with glabrous terete branches. *Leaves* 4–6 by $2\frac{3}{4}$–3 in., elliptic or elliptic-oblong, acute or subacuminate, entire, subcoriaceous, green above, pale beneath. *Flowers?* *Capsule* the size of a cherry, globose, obscurely 4-lobed. *Seed* 1 in each cell, aril red.—Closely resembling a *Microtropis* in the texture and colour of its leaves.

SECT. II. *Flowers* in 7- or more-flowered dichotomous cymes. (See 4. *E. crenulatus.*)

* *Flowers usually 5-merous.*

† *Branches cylindric.*

9. **E. dichotomus,** *Heyne in Roxb. Fl. Ind. ed. Carey,* ii. 410; leaves $1\frac{1}{2}$–2 in. lanceolate margins entire undulate, peduncles very slender, flowers very small. *Wall. Cat.* 4289; *W. & A. Prodr.* 160; *Thwaites Enum.* 73; *Bedd. Fl. Sylv. Anal. Gen.* lxiii.

WESTERN PENINSULA; Courtallam, *Heyne.* CEYLON, banks of streams at Galagama, *Thwaites.*

A small tree with twiggy branchlets. *Cymes* nearly as long as the leaves, exceedingly slender, but firm. *Petals* $\frac{1}{12}$ in., orbicular, entire, flat. *Fruit* obconical.

10. **E. glaber,** *Roxb. Fl. Ind.* i. 628; leaves smooth elliptic-oblong the upper half obtusely serrate, flowers white. *Wall. Cat.* 4281. ? E. serrulata, *Wall. Cat.* 4296.

EASTERN BENGAL, *Griffith;* ? Tavoy, *Wall.*

A small tree with smooth shining dark-brown bark. *Leaves* $2\frac{1}{2}$ by 1–$2\frac{1}{2}$ in., dark-green above, paler beneath. *Peduncles* stoutish, 1–$2\frac{1}{2}$ in. *Petals* $\frac{1}{6}$ in., orbicular, margins slightly undulate. *Fruit?*

VAR. Leaves 3–5 in. oblong-elliptic quite entire.—Bhotan, *Griffith.*

11. **E. serratifolius,** *Bedd. Fl. Sylv. Anal. Gen.* lxiv.; *Ic. Pl. Ind. Or.* 37, t. clxxi.; leaves smooth lanceolate sharply and prominently serrate.

WESTERN PENINSULA; slopes of the Nilghiris, at Carcom Ghat, alt. 3000 ft., *Beddome.*

Leaves $3\frac{1}{2}$–4 by $\frac{3}{4}$–$1\frac{1}{2}$ in., narrow to broad lanceolate, tapering at the apex to a short obtuse point. *Petals* $\frac{1}{8}$ in., orbicular, subcordate at the base, crenulate. *Fruit* globose, with 5 rounded lobes.—Apparently closely allied to *E. paniculatus*, from which it differs chiefly in its longer narrowed and more sharply serrate leaves.

12. **E. paniculatus,** *Hb. Wight;* leaves $3\frac{1}{2}$ by $1\frac{1}{3}$ in. smooth elliptic crenate-serrate membranous, flowers purplish. E. crenulata *var.* laxiflora, *Wight Ic.* i. 214.

WESTERN PENINSULA; on the Shivagherry hills, *Wight.*

Cymes lax and divaricating, $2\frac{1}{2}$–4 in. *Petals* orbicular, entire, $\frac{1}{5}$ in. across. *Fruit?*

13. **E. attenuatus,** *Wall. Cat.* 4298; leaves $3\frac{1}{2}$–6 by $\frac{3}{4}$–$1\frac{3}{4}$ in. smooth lanceolate-acuminate quite entire very coriaceous.

Khasia Mts., alt. 4–6000 ft., *Wallich*, &c.
A small tree? *Cymes* much shorter than the leaves, about 7-flowered. *Peduncles* stoutish, flattened, erect. *Petals* $\frac{1}{4}$ in., shortly clawed, nearly orbicular, fimbriate. *Fruit* obovoid, 4-angled.

14. **E. timorensis,** *Zipp. ? ex Turcz. in Bull. Mosc.* 1858, pt. i. 447; leaves smooth 4–6 by 2–$2\frac{1}{2}$ in. elliptic-oblong rounded or subacute at the apex faintly serrate.

Tenasserim or Andaman Islds., *Helfer*. Pegu, *Kurz*.—Distrib. Timor and Philippine Islds.
A tree? *Cymes* as long or nearly as long as the leaves; peduncles stouter than in the last species, flattened, erect. *Petals* not clawed, orbicular, fimbriate. *Fruit?*

15. **E. tingens,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 406; *Cat.* 4283; *Brand. For. Fl.* 79; leaves thick coriaceous rugose above ovate-lanceolate sharply-serrate.

Western Temperate Himalaya, alt. 6–10,000 ft., from Nipal, *Wallich;* to Simla, *Griffith*.
A tree 16–20 ft. *Leaves* $1\frac{1}{2}$–3 in. by $\frac{2}{3}$–1 in., lucid, dark-green above, very pale beneath. *Peduncles* compressed. *Petals* shortly clawed, nearly orbicular, coarsely crenulate, $\frac{1}{3}$ in., yellowish with purple veins. *Fruit* $\frac{1}{2}$ in., nearly round, 4–5-angled.—The flowers of this species are sometimes tetramerous.

†† *Branches acutely quadrangular.*

16. **E. angulatus,** *Wight Ic.* t. 1053; *Bedd. Fl. Sylv. Anal. Gen.* lxiv. E. acutangulus, *Wight Ill.* 178. E. pterocladus, *Hohenacker Pl. Ind. Or.* E. glaucus, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, pt. ii. 599.

Western Peninsula, Nilghiri hills, *Wight, &c.*
A small tree, young stems acutely 4-angled or -winged. *Leaves* $2\frac{1}{2}$–$4\frac{1}{2}$ by 1–$1\frac{3}{4}$ in., oblong-lanceolate to ovate-lanceolate, acute, quite entire, with a thickened margin. *Flowers?* *Fruit* narrowly obtriangular, acutely angled.

** *Flowers usually 4-merous.* (*See* 15. tingens.)

† Style 0.

17. **E. nitidus,** *Benth. in Hook. Lond. Journ. Bot.* i. 483; leaves $1\frac{1}{2}$–2 by $\frac{1}{2}$–1 in. obovate-lanceolate subacuminate, fruit roundly 4-angled. *Benth. Fl. Hongk.* 62; *Seem. Bot. Voy. Her.* 371, t. 83. E. punctatus, *Wall. Cat.* 4286.

Bengal; *Herb. Griffith (probably cult.)*.—Distrib. Hong Kong.
Leaves entire or obscurely serrate at the apex, coriaceous, shining. *Peduncles* filiform, $\frac{1}{2}$–1 in., usually twice divided. *Petals* orbicular, entire, $\frac{1}{12}$ in. across. *Fruit* $\frac{1}{2}$ in., subglobose.—This is perhaps an introduced plant in Bengal.

18. **E. bullatus,** *Wall. Cat.* 4299; leaves 4–10 by $2\frac{1}{2}$–4 in. ovate acute, fruit 4-angled. *Lodd. Bot. Cab.* t. 1749. Enonymus sp., *Wall. Cat.* 7473.

Khasia Mts.; alt. 3–4000 ft., *Wallich*, &c.
A tree? young branches terete or slightly flattened, thick and coarse. *Leaves* thick, entire, or faintly serrate at the apex, bullate above, nerves very prominent beneath. *Peduncles* many times divided. *Flowers* very numerous. *Petals* $\frac{1}{12}$ in., nearly orbicular, crenulate. *Fruit* 4-lobed, roundish, often only 1–3-seeded.

19. **E. fimbriatus,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 408; *Cat.* 4287; leaves ovate-acuminate biserrate membranous, fruit with 4 tapering wings. ? E. micranthus, *Don Prodr.* 191.

Temperate Himalaya; from Kumaon, alt. 8–10,000 ft., to Sikkim, alt. 10–12,000 ft., *J. D. H.*

A tree? *Leaves* $1\frac{1}{2}$–3 by $\frac{1}{2}$–$1\frac{1}{4}$ in., elegantly fringed with sharp deep biserratures, dark-green. *Peduncles* 2–3 in.; pedicels branching subumbellately. *Petals* $\frac{1}{12}$ in., white, broadly ovate, entire. *Fruit* leathery, the size of a cherry.—The woodcut given in Paxton's Flower Garden, ii. 55, t. 316, can hardly belong to this species; the leaves resemble more those of *E. pendulus* or *E. frigidus*.

20. **E. frigidus,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 409; *Cat.* 4288; adult leaves 3–5 by $\frac{3}{4}$–$1\frac{1}{2}$ in. oblong-lanceolate acuminate somewhat sharply serrate, fruit with 4 long tapering wings.

Sikkim Himalaya, alt. 8–12,000 ft., *J. D. H.;* Bhotan, *Griffith;* Kumaon, *Wallich*.

A small tree? young shoots succulent. *Flowers* very small, on weak succulent filiform peduncles and pedicels, the latter $\frac{1}{2}$ in. long. *Petals* orbicular, entire. *Fruit* as in the last species.

Var. Apparently a shrub, leaves 1 ft. by $\frac{1}{3}$ in. faintly and distantly serrate.

†† Style manifest.

a. *Fruit armed with spines.*

21. **E. cinereus,** *Laws.*; branches rough with minute tubercles, leaves obovate, fruit $\frac{3}{4}$ in. globose armed with pale-coloured spines.

East Bengal, *Griffith.*

Scandent? *Branches* destitute of rootlets. *Leaves* $2\frac{1}{2}$ by $1\frac{1}{4}$ in., broadly obovate, rounded at the apex, serrate, pale-coloured. *Flowers?*

22. **E. echinatus,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 410; *Cat.* 4285; branches smooth radicant, leaves ovate-lanceolate, fruit $\frac{1}{3}$ in. globose armed with dark-coloured spines. *Royle Ill.* t. 31; *Bot. Mag.* 2767; *Voigt Hort. Sub. Calc.* 165; *Brand. For. Fl.* 80. E. scandens, *Graham in Jameson's Ed. New. Phil. Journ.* 1827, 386. G. vagans, *Wall. Cat.* 4284, *in part.*

Temperate Himalaya; from Garwhal to Sikkim, alt. 7–10,000 ft.

Climbing over trees and rocks, to which the stems adhere by means of dense adventitious rootlets. *Leaves* 1–2 by $\frac{1}{2}$–$\frac{2}{3}$ in., serrate, dark-green above, pale beneath. *Peduncles* mostly 3 times divided. *Petals* $\frac{1}{6}$ in., orbicular, crenulate. *Style* $\frac{1}{24}$ in.

b. *Fruit unarmed.*

23. **E. vagans,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 412; *Cat.* 4284, *in part;* stem climbing, leaves 1–2 by $\frac{1}{2}$–$\frac{3}{4}$ in. ovate-lanceolate serrate, fruit the size of a pea nearly black minutely tubercled.

Temperate Himalaya; Sikkim and Nipal, *Wallich*, &c.

Branches smooth and never radicant. This and the smooth fruit are the only characters by which to distinguish this species from the last. In Bot. Mag. 54, t. 2767, Sir W. Hooker suggested that it might be a variety only, and he founded this opinion on the circumstance that he believed he had seen a tendency in some of the fruits of *E. vagans* to become echinate.

24. **E. Griffithii,** *Kurz in Journ. As. Soc. Beng.* 1872, pt. 2, 73; stem scandent acutely 4-angled or -winged, leaves 3–4 by 1–$1\frac{1}{2}$ in. ovate or oblong-lanceolate. Hippocratea angulata, *Griff. Notul.* iv. 473; *Ic. Pl. As.* iv. t. 581, f. i.

BIRMA; on rocks at Loonkaram and Delvi Nempean on the north from Assam, *Griffith.*

Leaves sessile or subsessile, serrate, subbullate. *Peduncles* twice divided. *Petals* $\frac{1}{12}$ in., white, orbicular, entire, shortly clawed. *Style* $\frac{1}{24}$ in. *Fruit?*

25. **E. theæfolius,** *Wall. Cat.* 4293; a small erect shrub, branches terete, leaves 2–3 by $\frac{3}{4}$–$1\frac{1}{2}$ in. ovate or oblong-lanceolate coriaceous.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich;* Sikkim, alt. 5–8000 ft., *J. D. H.;* KHASIA MTS., alt. 4–6000 ft., *Griffith,* &c.

Peduncles about twice divided, short, slender. *Petals* reddish, orbicular, entire, $\frac{1}{8}$ in. *Style* $\frac{1}{12}$ in. *Fruit* the size of a large pea, nearly round, obscurely 4-angled, 1-seeded.

26. **E. pendulus,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 406; *Cat.* 4280; a small tree with slender pendulous branchlets, leaves 4–6 in. oblong or oblong-lanceolate sharply serrate coriaceous smooth and shining above, petals fimbriate. *Brand. For. Fl.* 79. E. lucidus, *Don Prodr.* 191 ? *DC. Prodr.* ii. 4. E. japonicus, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 405 (*not Thunb.*).

TEMPERATE HIMALAYA; from Garwhal, *Falconer,* to Nipal, *Wallich;* EAST BENGAL, *Griffith.*

Branches terete. *Peduncles* much compressed, fascicled. *Petals* 4, $\frac{1}{4}$ in., white, ovate-oblong, fimbriate. *Stamens* and *style* $\frac{1}{8}$ in. *Fruit* $\frac{1}{2}$ in., obtriangular, with 4 tapering wings.—This is quite distinct from *E. japonicus,* Thunb. Fl. Jap. 100, of which there is a good plate in *Kæmpf. Ic. Select.* t. 8.

27. **E. Hamiltonianus,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 403; *Cat.* 4279; a shrub with terete branches, leaves 3–6 in. ovate or ovate-lanceolate very finely serrate membranous, petals entire. *Brand. For. Fl.* 78, t. xvi. E. atropurpureus, *Roxb. Fl. Ind.* i. 627 (*non Jacq.*).

TEMPERATE HIMALAYA, alt. 5–6000 ft., from Kashmir, *Falconer,* to Kumaon, *Strach. & Wint.;* KHASIA MTS., alt. 5–6000 ft., *Griffith,* &c.

Peduncles about 7-flowered. *Petals* $\frac{1}{8}$ in., cordate-lanceolate with revolute margins. *Stamens* and *style* $\frac{1}{8}$ in. *Fruit* turbinate, 4-lobed.

2. GLYPTOPETALUM, Thwaites.

Erect shrubs or small trees, glabrous. *Leaves* opposite, petioled, exstipulate. *Cymes* 3- or more-flowered. *Calyx* with 4 short spreading lobes. *Petals* 4, with 2 pit-like depressions on the upper surface. *Stamens* 4, inserted above the disk; the connective dilated; anther-cells diverging. *Disk* 4-lobed. *Ovary* immersed in the disk, 4-lobed, 4-celled; style short, stigma capitate; ovules solitary and pendulous from the top of each cell. *Capsule* subglobose, coriaceous, 1–4-celled, 1–4-seeded. *Seeds* as in *Euonymus.*—DISTRIB. Species 3. Ceylon, Southern India, and Malayan peninsula.

1. **G. zeylanicum,** *Thwaites in Hook. Kew Journ.* viii. 268, t. vii. B; *Enum.* 73; leaves $4\frac{1}{2}$–6 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., cymes not half as long as the leaves. *Bedd. Fl. Sylv. Anal. Gen.* lxiv.

WESTERN PENINSULA; Anamallay hills, *Beddome;* CEYLON, in the Central province, alt. 3000 ft., *Thwaites.*

A large shrub or tree, 30–40 ft. *Leaves* subcoriaceous or membranous, oblong or oblong-lanceolate or elliptic, serrate or entire. *Cymes* short, robust, 2–3 times divided, supra-axillary. *Petals* $\frac{1}{4}$ in., oblong. *Fruit* the size of a small cherry, greenish, smooth; pedicels $\frac{1}{2}$ in., straight.

2. **G. sclerocarpum,** *Kurz in Journ. As. Soc. Beng.* 1872, pt. ii. 299 leaves 8–12 by 2–3½ in., cymes not half as long as the leaves.

PEGU, *Kurz.*

A tree with thick coarse branches. *Leaves* very coriaceous, finely serrate or entire. *Cymes* stoutish. *Flowers?* *Fruit* globose, the size of a large cherry, rough with minute tubercles; pedicels 1½ in., straight.

3. **G. grandiflorum,** *Bedd. Ic. Pl. Ind. Or.* 21, t. 102; *Fl. Sylv. Anal. Gen.* lxv.; peduncles longer than the leaves.

WESTERN PENINSULA; damp forests of the Wynaad, alt. 2–2800 ft., *Beddome.*

Leaves subcoriaceous, 3½–5 by 1½–2 in., oblong-elliptic, rounded at the apex, acute or acuminate. *Peduncles* filiform, 3-flowered; pedicels 1 in., arcuate. *Flowers* 1¼ in. across. *Petals* obovate. *Fruit?*

3. **MICROTROPIS,** Wall.

Trees or shrubs, glabrous. *Leaves* opposite, petioled, or subsessile exstipulate, entire. *Flowers* in sessile clusters, or in peduncled cymes, axillary or supra-axillary, sometimes unisexual. *Sepals* 5, imbricate. *Petals* 5, rarely 0, connate at the base, erect. *Stamens* 5, inserted on the disk or on the tube of the corolla. *Disk* 0, or annular. *Ovary* free, ovoid, perfectly or imperfectly 2–3-celled; style very short; stigma minutely 2–4-lobed; ovules 2 in each cell, collateral at the inner angle. *Capsule* oblong, coriaceous, 1-celled, 2-valved, 1-seeded, surrounded at the base with the persistent calyx. *Seed* erect, stipitate; aril 0.—DISTRIB. Species 9; mountains of India, Ceylon, the Malayan peninsula and Java.

* *Flowers sessile, clustered on the branches.* (See 4, *densiflora.*)

1. **M. Wallichiana,** *Wight mss.*; leaves 2½–4 by 1–2 in. petioled oblong-elliptic acute at both ends, flowers few small, fruit tapering at the base rounded at the apex. *Thwaites Enum.* 71; *Bedd. Fl. Sylv. Anal. Gen.* lxv.

CEYLON; forests of the Central province and Saffragam, alt. 2–5000 ft.

A middle-sized tree with slender branches. *Petals* $\frac{1}{12}$ in., ovate-lanceolate, narrowed at the base, rounded at the apex. *Fruit* ¾ in.

2. **M. latifolia,** *Wight mss.*; leaves 4–5 by 2½–3 in. petioled oblong-lanceolate subacuminate, flowers large and more numerous than in the last species, fruit pointed at both ends. ? M. longifolia, *Wall. Cat.* 4339 *in part.*

WESTERN PENINSULA; from the Concan to the Nilghiris.

A small tree with almost black branches. *Leaves* pale green, very coriaceous and with a thickened margin, rugulose and opaque above. *Petals* ⅛ in., subovate. *Fruit* ¾ in.

3. **M. ramiflora,** *Wight Ic.* t. 977; leaves subsessile 1–3½ by ¾–2 in. broadly-elliptic or obovate rounded and slightly emarginate at the apex margins revolute, flowers in dense clusters, fruit acute at the apex. *Thwaites Enum.* 72; *Bedd. Fl. Sylv. Anal. Gen.* lxv.

WESTERN PENINSULA; Nilghiri Mts., *Wight.* CEYLON; common in the more elevated parts of the Central Province.

A small tree with thick coarse branches. *Leaves* very coriaceous, rounded or subcordate at the base, rugulose and opaque above. *Petals* ⅛ in., broadly obovate. *Fruit* ¾ in. *Testa* reddish brown.

** *Flowers in axillary or extra-axillary peduncled di- or trichotomous cymes.*

4. **M. densiflora,** *Wight Ic.* t. 1052; leaves 2–2$\frac{1}{2}$ by 1$\frac{1}{4}$–2 in. elliptic margins revolute very coriaceous, cymes $\frac{1}{2}$ in. short dense. *Bedd. Fl. Sylv. Anal. Gen.* lxv.

WESTERN PENINSULA; Nilghiri Mts., *Wight*, &c.

A large straggling shrub or small tree. *Flowers* sometimes almost sessile. *Petals* $\frac{1}{6}$ in., roundish-elliptic. *Fruit* $\frac{3}{4}$ in., narrowly oblong, acute at both ends.

5. **M. microcarpa,** *Wight Ic.* t. 975; leaves 1–3 by $\frac{1}{2}$–1$\frac{1}{4}$ in. elliptic- or broadly-lanceolate coriaceous margins revolute, cymes 1$\frac{1}{2}$–2 in. lax, fruit oblong narrowing to the acute apex, testa light brown.

WESTERN PENINSULA; from the Concan and Maisor southwards; dry jungles at Kotagherry in the Nilghiris, *Wight*.

An erect shrub. *Leaves* smooth above, glaucous beneath. *Cymes* di-trichotomous. *Petals* obovate-cuneate.

6. **M. ovalifolia,** *Wight Ic.* t. 976; leaves 1–3 by $\frac{1}{2}$–1$\frac{1}{4}$ in. ovate or broadly lanceolate coriaceous margins revolute, fruit ovoid subacute, testa crimson. *Bedd. Fl. Sylv. Anal. Gen.* lxv. Elæodendron nilghirense, *Wall. Cat.* 4409.

WESTERN PENINSULA; Nilghiri hills, Courtallam and Ootacamund, *Wight*, &c.

A somewhat diffuse shrub. *Cymes* trichotomous, 2–3 in. *Petals* orbicular.—Very closely allied to *M. microcarpa*, of which it may prove to be a variety.

7. **M. discolor,** *Wall. Cat.* 4337; leaves 3–5 by 1$\frac{1}{4}$–2$\frac{1}{2}$ in. elliptic subacuminate membranous flat, cymes $\frac{1}{2}$–1 in. compact. *Arn. in Ann. Nat. Hist.* iii. 152. Cassine discolor, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 378. Celastrinea ? *Wall Cat.* 9014. Euonymus garcinifolius, *Roxb. Fl. Ind.* i. 628.

SUBTROPICAL HIMALAYA; Kumaon, *Wallich;* Sikkim, alt. 4–7000 ft., *J. D. H.;* KHASIA MTS., alt. 1–7000 ft., *J. D. H.* & *T. T.;* TENASSERIM, *Wallich*, &c.

A small tree. *Petals* $\frac{1}{6}$ in., elliptic, concave. *Fruit* $\frac{1}{2}$ in., ovoid.

8. **M. bivalvis,** *Wall. Cat.* 4340; leaves 4–8 by 1$\frac{1}{4}$–2$\frac{1}{2}$ in. ovate to oblong-lanceolate acuminate membranous or subcoriaceous margins flat, cymes 2–4 in. di-trichotomous branches widely divaricating. Celastrus bivalvis, *Jack. in Hook. Bot. Misc.* ii. 71; *Roxb. Fl. Ind. ed. Carey*, ii. 399; *DC. Prodr.* ii. 6. Euonymus ? læta, *Wall. Cat.* 4294. E. capillaceus, *Wall. Cat.* 7270. E. filiformis, *Wall. Cat.* 4295. Paracelastrus bivalvis, *Miq. Fl. Ind. Bat.* i. pt. 2, 591.

EASTERN PENINSULA; from Tenasserim to Penang, *Wallich;* Malacca, *Maingay.*—DISTRIB. Sumatra, Java.

Branches slender. *Peduncles* extra-axillary, usually springing from the branches at right angles. *Petals* elliptic, $\frac{1}{6}$ in. *Fruit* ellipsoid.

4. LOPHOPETALUM, Wight.

Trees and shrubs, usually glabrous. *Leaves* opposite or alternate, petioled, exstipulate. *Calyx* 5-lobed, lobes round short. *Petals* 5, continuous with the disk, persistent, the upper surface cristate or lamellate or covered with fleshy villi or naked. *Stamens* 5, inserted on the disk; anthers oblong. *Disk* large, entire or lobed. *Ovary* small, immersed in the disk and continuous with it, trigonal or pyramidal, 3–4-celled, contracted into a short style, stigma capitate; ovules 4 or more in each cell, in 2 series. *Capsule* coriaceous, 3–4-angled, 3–4-celled, loculicidal. *Seeds* few, rarely winged, arillate, albumen fleshy.—DISTRIB. Species 8; Indian Malayan and Javan.

The species without fruit have been referred to this genus by habit alone.

SECT. I. *Petals* crested. *Disk* flat, adhering to the calyx, 5-lobed; lobes continuous with the petals.

1. **L. Wightianum,** *Arn. in Ann. Nat. Hist.* iii. 151; leaves 5–9 by 2–4 in., flowers $\frac{3}{4}$ in. diam. *Wight Ill.* 178; *Ic.* t. 162; *Walp. Rep.* i. 530; *Dalz. & Gibs. Bomb. Fl.* 48; *Bedd. Fl. Sylv.* t. 145; *Fl. Sylv. Anal. Gen.* lxv.

WESTERN PENINSULA, from the Concan southwards.

A large tree. *Leaves* coriaceous. *Cymes* axillary or terminal, branching paniculately several times. *Petals* with a membranous corrugated crest. *Fruit* 4 in. long, 3-celled, sharply triangular. *Seeds* oblong, compressed.

2. **L. fimbriatum,** *Wight Ill.* i. 178; leaves 4–7 by 2–$3\frac{1}{2}$ in. ovate or ovate-oblong shortly acuminate, flowers nearly $\frac{1}{2}$ in. diam. L. ovatum *Presl Botan. Bemerk.* 32. L. javanum *Turcz. in Bull. Soc. Nat. Mosc.* 1863, pt. i. 545. Euonymus ovata, *Wall. Cat.* 4300.

SILHET, *Wallich*; TENASSERIM, at Mergui, *Griffith*.

Leaves more thin and membranous than in *L. Wightianum*. *Flowers* in axillary or terminal rigid divaricating paniculate cymes. *Petals* with a fimbriate crest. *Fruit*?

SECT. II. *Petals* corrugated or crisped (except 6. *floribundum*) on the upper surface. *Disk* flat, 10-lobed, lining the calyx.

3. **L. pallidum,** *Laws.*; leaves $2\frac{1}{2}$–3 by 1–$1\frac{1}{4}$ in. elliptic-oblong, cymes $1\frac{1}{2}$ in. glabrous, disk faintly lobed with long fleshy hairs surrounding the base of the stamens otherwise naked.

MALACCA, *Maingay*.

A tree; whole plant quite glabrous. *Leaves* pale ash-coloured, almost shining, petiole $\frac{1}{2}$–$\frac{1}{3}$ in. *Cymes* axillary. *Petals* $\frac{1}{12}$ in., broadly ovate, corrugated on the upper surface.—A very distinct species, readily known by the colour of its leaves, and the ring of fleshy hairs surrounding the stamens.

4. **L. Wallichii,** *Kurz in Journ. As. Soc. Beng.* 1872, pt. ii. 299; leaves 6–8 by 3–$3\frac{1}{2}$ in. ovate-oblong rounded at the apex, cymes 6 or more in. glabrous, disk faintly 10-lobed covered with fleshy warts.

TENASSERIM, at Tavoy, *Parish*; BIRMA, *Kurz*.

A large glabrous tree. *Leaves* glaucescent, green and shining above, opaque beneath, coriaceous; petiole 1–$1\frac{1}{2}$ in. *Cymes* axillary and terminal, paniculate. *Petals* $\frac{1}{12}$ in., crisped on the upper surface, whitish. *Disk* yellow. *Capsule* 4 or more by 2 in., smooth, 3-lobed, 3-valved. *Seeds* compressed, imbricate; wings 2–$2\frac{1}{2}$ in., elliptic-oblong, membranous.—The description of the fruit and seed is taken from Kurz. In a letter to Dr. Hooker he would make *Prismatocarpus littoralis*, Wall. Cat. 6520, a synonym of the above, but in this he is in error.

5. **L. celastroides,** *Laws.*; leaves $2\frac{1}{2}$–4 by $1\frac{1}{2}$–$2\frac{1}{2}$ in. ovate acute or rounded at the apex, cymes 6 in.–1 ft. glabrous, disk very faintly lobed entirely covered with minute fleshy lobulate warts.

TENASSERIM at MOULMEIN, *Griffith*; PEGU, *M'Clelland*.

A tree?; whole plant quite glabrous. *Leaves* coriaceous; petiole 1–$1\frac{1}{4}$ in. *Flowers* in large axillary and terminal widely-divaricating paniculate cymes. *Petals* $\frac{1}{12}$ in., ovate from a broad base, slightly corrugated. *Fruit*?—Closely allied to *L. Wallichii*.

6. **L. floribundum,** *Wight Ill.* i. 178; leaves 3½–6 by 1–2 in. oblong-elliptic, cymes 6–8 in. puberulous, disk naked 5-angled, petals naked.

TENASSERIM, at Mergui, *Griffith.*

A tree; quite glabrous with the exception of the inflorescence. *Leaves* acute, coriaceous; petiole ⅓–½ in. *Flowers* in diffuse divaricating cymes. *Petals* $\frac{1}{16}$ in., ovate-orbicular.

SECT. III. *Petals* and disk naked. *Disk* cupular with a free margin.

7. **L. filiforme,** *Laws.;* branches very slender almost filiform, leaves 3 by 1¼ in. oblong-lanceolate subacuminate with crisped margins membranous, petals ⅛ in.

TENASSERIM, at Mergui, *Griffith.*

Whole plant quite glabrous. *Cymes* axillary, very slender, shorter than the leaves, subpaniculate. *Flowers* shortly pedicellate. *Petals* ovate, rounded at the apex. *Fruit?*—A very distinct species readily distinguished from the rest by its very slender branches and crisped leaves.

8. **L. reflexum,** *Laws.;* branches short, leaves 2½–3 by ¾–1¼ in. ovate-lanceolate acuminate with reflexed tips coriaceous margins flat, flowers very small.

MALACCA, *Maingay.*

Whole plant quite glabrous. *Leaves* minutely pellucidly punctate. *Flowers* in rigid divaricating paniculate cymes longer than the leaves, shortly pedicellate, yellow. *Fruit?*—The description of the flowers is taken from Maingay's mss.

9. **L. dubium,** *Laws.;* branches stout coarse, leaves 3 by 1¾ in. elliptic acute at both ends with a reflexed tip coriaceous margins flat, petals ⅙ in.

MALACCA, *Maingay.*

A tree; whole plant quite glabrous. *Flowers* in stoutish erect spicate axillary cymes, shorter than the leaves, almost sessile. *Petals* subtriangular. *Fruit?*

5. KOKOONA, Thwaites.

Branching trees with yellow or pale-coloured bark. *Leaves* opposite, petioled, coriaceous. *Calyx* small, 5-lobed. *Petals* 5, coriaceous, with glandular dots. *Stamens* 5, inserted into the margin of the disk; anthers oblong. *Disk* thick, glandular, obscurely angled. *Ovary* immersed in the disk, 3-celled; style short, stigma 3-lobed; ovules 4 in each cell, in 2 series, adnate to the axis, ascending. *Capsule* woody, oblong, 3-gonous, 3-celled, 3-valved; cells 4-seeded. *Seeds* broadly winged above, imbricate, exalbuminous.—DISTRIB. Species 3. Ceylon, Malayan Peninsula, and Borneo.

A genus perhaps too closely allied to *Lophopetalum* to be kept separate when the fruit of more of the species of the latter genus is known.

1. **K. zeylanica,** *Thwaites in Hook. Kew Journ. Bot.* v. 380, t. 6; *Enum.* 52; leaves crenate or serrate, petals naked brown with numerous minute dark red glandular dots, fruit oblong. *Beddome Fl. Sylv.* t. 146; *Fl. Sylv. Anal. Gen.* lxv.

WESTERN PENINSULA; Amamallay hills, *Beddome;* CEYLON; banks of streams in the Ambagamowa and Suffragam districts, alt. 2–4000 ft.

Leaves on young plants 6–8 in., oblong-lanceolate, subacuminate, serrate; on adult trees 2½–3½ in., elliptic or obovate, crenate, rounded at the apex or emarginate, dark-green above and glabrous, paler beneath and with numerous dark-red glandular dots. *Petals* broadly ovate. *Fruit* 1–4 in., bluntly triangular.—An oil is expressed from the seeds and used for burning in lamps. *Thwaites.*

2. **K. littoralis,** *Laws.*; leaves entire, petals sublamellate dotless, fruit ovate-lanceolate acute. Trigonocarpus littoralis, *Wall. Cat.* 6520.

MALACCA, *Maingay;* SINGAPORE, *Lobb.*

A tall tree, always growing in the water. *Leaves* 3½–4½ in., elliptic, dotless. *Petals* ovate. *Fruit* 1½–2 in.

6. PLEUROSTYLIA, Wight.

A glabrous shrub. *Leaves* opposite, shortly petioled, entire, exstipulate. *Cymes* axillary, very short, few-flowered. *Calyx* small, 4-lobed. *Petals* 5, much larger than the calyx.. *Stamens* 5, inserted below the disk; connective dilated at the back. *Disk* thick, crenulate. *Ovary* half immersed in the disk, 2-celled or more commonly by abortion 1-celled; style short, stigma broadly peltate; ovules 2 in each cell, erect. *Fruit* 1–2-celled, coriaceous, indehiscent. *Seed* 1 rarely 2, erect, covered by the arillus-like endocarp, albumen fleshy abundant; cotyledons orbicular. — DISTRIB. Species 1 or 2; mountains of India, Ceylon, Mauritius and Madagascar.

1. **P. Wightii,** *W. & A. Prodr.* 157; *Wight Ic.* 155; *Thwaites Enum.* 71; *Dalz. & Gibs. Bomb. Fl.* 47. P. Heynei, *W. & A. Prodr.* 157. Celastrus opposita, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 398; *Cat.* 4314; C. ?? Wightiana, *Wall. Cat.* 4322.

WESTERN PENINSULA; Mountains of Malabar, Nilghiris, Quilon, and Courtallam. CEYLON; in the hot dry parts of the island.—DISTRIB. Mauritius and Madagascar.

Leaves elliptic-oblong to narrow oblong-lanceolate.

7. CELASTRUS, Linn.

Scandent shrubs. *Leaves* alternate, petioled; stipules minute and deciduous, or 0. *Flowers* polygamous, in terminal or axillary panicles or racemes. *Calyx* 5-cleft. *Petals* 5, spreading. *Disk* broad, concave. *Stamens* 5, inserted on the margin of the disk. *Ovary* not immersed in the disk, 2–4-celled; style short, stigma 3-lobed, rarely 3-fid with the segments recurved; ovules 2 in each cell, erect. *Capsule* globose or obovoid, 1–3-celled, 1–6-seeded. *Seeds* enveloped in a fleshy aril, albumen fleshy; cotyledons foliaceous.—DISTRIB. Species scarcely 15, natives of tropical Asia, China, Japan, Australia and North America.

I. *Branches covered with pale lenticular warts.*

1. **C. paniculata,** *Willd. Sp. Pl.* i. 1125; calyx-segments half-orbicular, petals ⅛ in. obovate-oblong entire, style acute not lobed, fruit 3-celled 3–6-seeded, seed ⅙ in. ovoid brown. *Wall. Cat.* 4310; *Roxb. Fl. Ind.* i. 621; *DC. Prodr.* ii. 6; *W. & A. Prodr.* 158; *Wight Ill.* 179, t. 72; *Ic.* t. 158; *Brand. For. Fl.* 82; *Dalz. & Gibs. Bomb. Fl.* 47; *Thwaites Enum.* 72; *Voigt Hort. Sub. Calc.* 166. C. alnifolia, *Don Prodr.* 190; *DC. Prodr.* ii. 6. C. dependens, *Wall. Cat.* 4302; *Voigt Hort. Sub. Calc.* 166. C. multiflora, *Roxb. Fl. Ind.* i. 622. C. nutans, *Roxb. Fl. Ind.* i. 623; *Wall. Cat.* 4301. C. Rothiana, *Rœm. & Schult. Syst.* v. 423; *DC. Prodr.* ii. 8. C. Metziana, *Turcz. in Bull. Soc. Nat. Mosc.* 1858, 447. Ceanothus paniculatus, *Roth Nov. Sp.* 154. Scutia paniculata, *Don Gen. Syst.* ii. 34.

TROPICAL and SUBTROPICAL HIMALAYA, alt. 1–4000 ft.,; PANJAB, and throughout the hilly districts of INDIA, ascending to 3000 ft.; CEYLON, ascending to 2000 ft.—DISTRIB. Malay Archipelago, and Philippine Islds.

A scandent shrub with terete branches, the young shoots and branches pendulous. *Leaves* $2\frac{1}{2}$–5 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., oval oblong or ovate or obovate, acuminate, serrate, membranous. *Flowers* yellowish-green, in terminal pendulous panicles. *Petals* $\frac{1}{12}$ in., oblong.—Foliage very variable. An oil for burning in lamps is expressed from the seeds.

2. **C. stylosa,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 401; *Cat.* 4313; calyx-segments ovate rounded, petals $\frac{1}{6}$ in. oblong with wavy margins, style 3-lobed, fruit 3-celled 3–6-seeded, seed $\frac{1}{4}$ by $\frac{1}{9}$ in. curved black. *Voigt Hort. Sub. Calc.* 166.

NIPAL, *Wallich;* SIKKIM HIMALAYA, alt. 5–6000 ft., *J. D. H.;* KHASIA MTS., alt. 4–5000 ft., *Griffith,* &c.; ? PEGU, *M'Clelland.*

A scandent shrub with terete branches. *Leaves* $2\frac{1}{2}$–4 by $1\frac{1}{4}$–2 in., elliptic or ovate-oblong, acute or subacuminate, serrate. *Flowers* in short axillary or terminal irregular racemose cymes. *Fruit* yellow, crowned by the persistent style.

II. *Branches destitute of lenticels.*

3. **C. venulosa,** *Wall. Cat.* 4321; calyx-segments half orbicular, petals $\frac{1}{7}$ in. linear-oblong with wavy margins, style acute not lobed.

SILHET, *Wallich.*

A scandent shrub, with smooth pale-brown round branches, or dark brown and rather rough. *Leaves* 4–6 by 2–$2\frac{1}{2}$ in., elliptic-oblong, narrowed at the base, suddenly and shortly acuminate, faintly serrate membranous, venation conspicuous but very delicate, shining. *Flowers* in short axillary or terminal spicate cymes. *Fruit?*—A single specimen from Silhet in the Wallichian Herbarium. Closely allied to *C. paniculata.*

4. **C. monosperma,** *Roxb. Hort. Beng.* 18; *Fl. Ind.* i. 625; calyx-segments broadly and roundly ovate, petals $\frac{1}{12}$ in. suborbicular, style 3-lobed, fruit 1-celled 1-seeded, seed $\frac{1}{3}$ in. elliptical brown. *Wall. Cat.* 4311 *and* 7009; *Benth. Fl. Hongk.* 63; *Voigt Hort. Sub. Calc.* 166. C. Hindsii, *Benth. in Hook. Kew Journ. Bot.* iii. 334. Catha monosperma, *Benth. in Hook. Lond. Journ. Bot.* i. 483. C. Benthamii, *Gardn. & Champ. in Hook. Kew Journ.* i. 310.

EASTERN BENGAL and ASSAM, *Wallich, Griffith,* &c.—DISTRIB. China.

A scandent shrub with quadrangular branches. *Leaves* 2–4 by 1–$1\frac{3}{4}$ in., oblong-elliptic, acuminate, sharply serrulate, coriaceous. *Flowers* white or greenish-yellow, in short pedunculate cymes, frequently disposed in long slender axillary or terminal naked or leafy racemes. *Petals* very finely crenate.—The whole plant drying black.

DOUBTFUL AND EXCLUDED SPECIES.

C. CRENULATA, *Wall. Cat.* 4323, is a Siam plant.

C. FINLAYSONIANA, *Wall. Cat.* 4324, is a native of Siam.

C. LUCIDA, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 400; *Wall. Cat.* 4318. C. Jackianus, *Steud. Nomenc.* 314 (capsules many-seeded).

C. MICRANTHA, *Roxb. Fl. Ind.* i. 625 (leaves pinnate). A native of the Moluccas.

C. PAUCIFLORA, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 400 (ovary 1-celled, placenta parietal).

C. RACEMOSA, *Wall. Cat.* 4320, without flowers or fruit is indeterminable.

C. TRIGYNA, *Lam.; Roxb. Fl. Ind.* i. 624; *Wall. Cat.* 4315. C. obtusifolia, *Roxb. Fl. Ind.* i. 625, is a native of the Mauritius, not of the Moluccas as stated by Roxburgh under *trigyna.*

C. VERTICILLATA, *Roxb. Fl. Ind.* i. 624, is Pittosporum floribundum, *W. & A.*

8. **GYMNOSPORIA,** W. & A.

Shrubs or small trees, branches often spinescent. *Leaves* alternate, exstipulate. *Flowers* in small dichotomous cymes. *Calyx* 4–5-cleft. *Petals* 4–5, spreading. *Stamens* 4–5, inserted underneath the disk. *Disk* broad, sinuate or lobed. *Ovary* attached by a broad base, or immersed in the disk, 2–3-celled; style short, 2–3-lobed; ovules 2 in each cell. *Capsule* obovoid, or nearly globose. *Seeds* 1–2 in each cell, aril completely or partially covering the seed, or 0, albumen fleshy; cotyledons foliaceous.—Distrib. Species 60, natives of the hotter parts of the whole world.

* *Branches unarmed.*

1. **G. acuminata,** *Hook. f.;* leaves 5–8 by 2–3$\frac{1}{3}$ in. ovate-oblong acuminate serrate membranous glabrous. Celastrus oxyphylla, *Wall. Cat.* 4312.

Sikkim Himalaya, alt. 2–5000 ft., *J.D.H.;* Khasia Mts., alt. 4–5000 ft.; Eastern Peninsula and Birma, *Griffith.*—Distrib. Yunan.

A shrub with somewhat slender branches. *Flowers* in very delicate fasciculate dichotomous cymes $\frac{1}{2}$–1 in. long. *Petals* $\frac{1}{14}$ in., oblong-elliptic, reddish. *Fruit* $\frac{1}{3}$–$\frac{1}{2}$ in., roundly obcordate, somewhat compressed, 2-celled, 2-seeded, black.

2. **G. neglecta,** *Wall. Cat.* 4341 (*under* Celastrus); leaves 4–6 by 2–2$\frac{1}{2}$ in. ovate-elliptic acute or subacuminate entire or very faintly serrate towards the apex very coriaceous glabrous. C. ? attenuata, *Wall. Cat.* 4319. ? Bæobotrys acuminata, *Wall. Cat.* 2321.

Nipal and Silhet, *Wallich.*

A shrub ? with thick stout branches. *Flowers* $\frac{1}{2}$–1 in. long, in very delicate dichotomous cymes. *Petals* as in *G. acuminata. Fruit* nearly globose, about $\frac{1}{4}$ in., light yellow, 3-celled, 1–3-seeded.

3. **G. salicifolia,** *Laws.;* leaves 3–4 by $\frac{1}{3}$–$\frac{1}{2}$ in. narrowly lanceolate serrate glabrous.

Assam, *Simons.*

A shrub ? with erect slender dark-coloured branches. *Flowers* in slender di-trichotomous cymes 1–2$\frac{1}{2}$ in. long. *Petals* $\frac{1}{10}$ in., suboval, concave, pinkish-white. *Fruit ?*

4. **G. oblanceolata,** *Laws.;* leaves 3–4 by $\frac{1}{2}$–$\frac{3}{4}$ in. oblanceolate tapering into the petiole serrate in the upper half coriaceous glabrous, margins revolute in the lower half.

Birma, *Griffith.*

A tortuous shrub with smooth blackish branches. *Flowers* in delicate trichotomous cymes $\frac{1}{2}$–1 in. long. *Fruit ?*

5. **G. puberula,** *Laws.;* leaves 2–2$\frac{1}{2}$ by 1$\frac{1}{4}$–1$\frac{1}{2}$ in. broadly obovate subacuminate serrate-crenate membranous puberulous on the nerves beneath.

Bombay, *Law.*

A shrub with stout branches, young branches and peduncles puberulous. *Flowers* in slender dichotomous cymes 2–3 in. long, which are axillary or fascicled at the ends of short branches. *Fruit* obovate, $\frac{1}{3}$ in. ?

6. **G. fruticosa,** *Thwaites Enum.* 72 (*under* Catha); leaves $\frac{3}{4}$–1$\frac{1}{2}$ by $\frac{1}{3}$–$\frac{1}{2}$ in. oblong-spathulate crenate-serrate glabrous.

Ceylon; Central province, &c., *Thwaites.*

A shrub, 8–10 ft.; young branches angular. *Flowers* in corymbose cymes shorter than the leaves; pedicels $\frac{1}{2}$ in., filiform. *Fruit* $\frac{1}{6}$–$\frac{1}{5}$ in., turbinate, reddish brown, with faint transverse striæ, 3-celled, cells 1-seeded. *Seeds* red, shining, aril small, whitish. —Very like some of the unarmed forms of *G. montana*, but it may be known from them by the slender filiform pedicels and the colour of the capsules.

7. **G. ovata,** *Wall. Cat.* 4308 (*under* Celastrus); leaves 1$\frac{3}{4}$–3 by 1$\frac{1}{4}$–1$\frac{3}{4}$ in. roundly ovate or subovate serrate coriaceous glabrous. *W. & A. Prodr.* 159. Catha ovata, *Walp. Rep.* i. 532.

WESTERN PENINSULA; Nilghiri Mts., *Noton*, &c.

A shrub, drying blackish. *Flowers* small, in fasciculate sessile dichotomous cymes $\frac{1}{4}$–$1\frac{1}{2}$ in. *Fruit* broadly obovate, $\frac{1}{2}$ in., drying black, 3-celled; cells 1–2-seeded.

VAR.; stems more slender and straight, leaves oblong narrowed below rounded at the apex not turning blackish when dried.—Malabar, *Wight.*

8. **G. Rothiana,** *W. & A. Prodr.* 159 (Celastrus); leaves 3–4 by $1\frac{3}{4}$–2 in. elliptic or obovate subcuneate at the base coriaceous glabrous. *Dalz. & Gibs. Bomb. Fl.* 47. C. serrulata, *Roth Nov. Sp.* 155 *in part.* C. Wallichiana, *Wall. Cat.* 4304, c *in part.* Catha Rothiana, *Walp. Rep.* i. 532.

WESTERN PENINSULA; the Concan and Canara, *Heyne*, &c.

Branches thick and coarse, sometimes armed. *Leaves* crenulate. *Flowers* in cymes so reduced that they become sessile and clustered. *Fruit* obovate, $\frac{1}{2}$ in., 3-celled; cells 3-seeded.

** *Branches armed; spines naked.* (*See* 8. G. Rothiana.)

9. **G. rugulosa,** *Laws.*; leaves 6 by $2\frac{1}{2}$ in. oblong subacuminate, fruit $\frac{1}{2}$ in. solitary on pedicels $\frac{3}{4}$ in. obovoid transversely wrinkled.

MISHMI HILLS, *Griffith.*

A tree? branches with smooth bark, very sparingly armed; spines very short. *Leaves* faintly serrate, coriaceous. *Flowers?* *Fruit* 3-celled; cells 1-seeded.

10. **G. Heyneana,** *W. & A. Prodr.* 159 (Celastrus); leaves 3–4 by $1\frac{3}{4}$–$2\frac{1}{4}$ in. elliptic crenate-serrate, fruiting cymes 3 in. dichotomous, capsule obovoid $\frac{1}{2}$ in. smooth. Celastrus Heyneana, *Roth in Rœm. & Schult. Syst.* v. 421 *in part; DC. Prodr.* ii. 7. C. serrulata, *Roth Nov. Sp.* 155 *in part.* C. Wallichiana, *Spreng. in Wall. Cat.* 4304 c *in part.* Catha Heyneana, *Walp. Rep.* i. 532.

WESTERN PENINSULA, *Heyne;* Pulney Mts., *Wight.*

A tree? branches with smooth blackish bark, spines straight, $\frac{1}{2}$ in. *Flowers* in axillary dichotomous cymes 2–3 in. *Petals* broadly ovate, $\frac{1}{8}$ in. *Fruit* turbinate, 3-celled, cells 1–2-seeded, drying blackish.

11. **G. Falconeri,** *Laws.*; leaves $2\frac{1}{2}$ by $1\frac{1}{4}$ in. obovate or subelliptic serrate scabrous above pubescent beneath, fruit $\frac{1}{4}$ in. diam. solitary on short peduncles or in small dichotomous cymes $\frac{1}{2}$ in. long globose smooth 3-celled 1–2-seeded.

NORTH-WEST INDIA, *Herb. Falconer.*

A tree? branches thickish, sparingly armed; spines $\frac{1}{2}$ in. *Flowers?*—Known from all the other *Gymnosporiæ* by its pubescent leaves.

12. **G. rufa,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 397 (Celastrus); leaves 3–5 by 1–$1\frac{1}{2}$ in. lanceolate acuminate serrate subcoriaceous glabrous, cymes 1–2 in. capillary dichotomous fascicled, fruit $\frac{1}{6}$–$\frac{1}{4}$ in. obtriangular 3-celled, cells 1-seeded. Celastrus rufa, *Cat.* 4309; *Brand. For. Fl.* 80. Catha rufa, *Don Gen. Syst.* ii. 10; *Walp. Rep.* i. 532.

SUBTROPICAL HIMALAYA; from Kumaon, alt. 2–5000 ft., to Sikkim and Bhotan, alt. 3–6000 ft. KHASIA MTS., alt. 2–4800 ft.

A large branching tree, with slender sparingly-armed branches; spines slender, $\frac{1}{2}$–1 in. *Leaves* green above, pale beneath. *Flowers* small. *Petals* $\frac{1}{16}$ in. *Fruit* pale-yellow inside. *Seeds* black.

13. **G. Royleana,** *Wall. Cat.* 4317 (Celastrus); leaves $\frac{3}{4}$–$1\frac{3}{4}$ by $\frac{1}{3}$–1 in. ovate to obovate glabrous, cymes dichotomous shorter than the leaves, fruit turbinate $\frac{1}{4}$–$\frac{1}{3}$ in. diam. 3-celled, cells 1-seeded. C. spinosus, *Royle Ill.* 157; *Boiss. Fl. Orient.* ii. 11; *Brand. For. Fl.* 80.

WESTERN HIMALAYA; in Kumaon and Garwhal, alt. 1–4500 ft. ? CONCAN, *Stocks.*—DISTRIB. Affghanistan.

A shrub with very thorny straight or slightly zigzag branches; spines slender, $\frac{1}{2}$-1 in. *Leaves* serrate. *Petals* $\frac{1}{8}$–$\frac{1}{6}$ in., white, oblong-ovate.

** *Branches armed. Spines bearing leaves and flowers.*

14. **G. Wallichiana,** *Spreng. Syst.* 5, *Index* 150 (*under* Celastrus rigida); leaves 1–1$\frac{1}{2}$ by $\frac{3}{4}$–1 in. obovate crenate, fruit turbinate $\frac{1}{2}$ in. Celastrus Wallichiana, *W. & A. Prodr.* 159; *Wall. Cat.* 4304. C. rigida, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 396. C. buxifolia, *Roxb. Hort. Beng.* 18. Catha Wallichii, *Don Gen. Syst.* ii. 10; *Walp. Rep.* i. 532.

PANJAB, at Peshawur, *Falconer;* WESTERN PENINSULA; Courtallam, *Wight;* Maisor, *G. Thomson;* EASTERN BENGAL, *Herb. Griffith.*

A shrub with zigzag branches, profusely armed with stout spines 1–3 in. long. *Leaves* coriaceous, glabrous. *Cymes* shorter than the leaves, axillary and on the spines. *Fruit* somewhat inflated, 3-celled; cells 1-seeded.

15. **G. emarginata,** *Roth Nov. Sp.* 155 (Celastrus); leaves 1–2$\frac{1}{2}$ by $\frac{1}{2}$–1$\frac{1}{4}$ in. obovate-cuneate entire, flowers fascicled in the axis of the leaves and on the spines, fruit turbinate $\frac{1}{4}$ in. C. emarginata, *W. & A. Prodr.* 160; *DC. Prodr.* ii. 8; *Wall. Cat.* 4305; *Roxb. Fl. Ind.* i. 620; *Grah. Cat. Bomb. Pl.* 39; *Voigt Hort. Sub. Calc.* 166. Catha emarginata, *Don Gen. Syst.* ii. 9; *Thwaites Enum.* 72; *Walp. Rep.* i. 532.

WESTERN PENINSULA, *Shuter;* Concan, *Graham;* Anamallay hills, *Wight.* CEYLON, in hot dry parts of the Island.

A shrub with stout zigzag branches, profusely armed with spines 1–2$\frac{1}{2}$ in. long. *Leaves* sometimes broadly ovate, emarginate, very coriaceous. *Flowers* on slender delicate pedicels $\frac{1}{2}$ in. long. *Fruit* 3-celled, 1-seeded.

16. **G. montana,** *Roxb. Fl. Ind.* i. 620 (Celastrus); leaves 1–3 by $\frac{1}{4}$–2 in. linear obovate to orbicular-obovate crenulate, cymes rigid divaricating shorter than the leaves, fruit globose $\frac{1}{6}$ in. black 1–3-celled, cells 1-seeded. Celastrus montana, *W. & A. Prodr.* 159; *Grah. Cat. Bomb. Pl.* 381; *Wall. Cat.* 4306; *Wight Ic.* 382; *Voigt Hort. Sub. Calc.* 166; *Roth Nov. Sp.* 154; *DC. Prodr.* ii. 9; *Bedd. Fl. Sylvat. Anal. Gen.* lxvi.; *Dalz. & Gibs. Bomb. Fl.* 48. C. pallida, *Wall. Cat.* 4307; *Voigt Hort. Sub. Calc.* 167. C. crenatus, *Roth Nov. Sp.* 156, *not of Forst.* ? C. senegalensis, *Lam.; DC. Prodr.* ii. 8; *Boiss. Fl. Or.* ii. 11; *Brand. For. Fl.* 81. Catha montana, *G. Don Gen. Syst.* ii. 10.

Throughout the drier parts of CENTRAL, SOUTH-WESTERN, and NORTH-WESTERN INDIA.—DISTRIB. Affghanistan; Central Africa; Malay Archipelago; Australia.

Branches straight, or only slightly zigzag, profusely armed, rarely unarmed. *Cymes* axillary or borne on the spines, forking many times. *Capsules* numerous, with the size and look of a pepper corn.—Although the extreme forms of this species are very distinct, it is impossible to find characters to limit them. *Celastrus montana*, Roxb., comprises those forms which have the branches less profusely armed, and the leaves larger and broader; *C. senegalensis*, Lam., those in which the stems are more robust, and profusely armed, and the leaves smaller and narrower. *C. pallida,* Wall., may prove to be a distinct species. De Candolle regards Roxburgh's and Roth's *montana* as different species, but I follow Wight and Arnott in uniting them.

9. **KURRIMIA**, Wall.

Trees, usually quite glabrous, young branches tipped with the deciduous stipules. *Leaves* opposite, rarely alternate, towards the ends of the branches, coriaceous, entire, shining, penninerved; petiole slender.

Flowers in simple or paniculately disposed racemes. *Calyx* 5-fid or -lobed, recurved. *Petals* 5, inserted under the margin of the disk, spreading or recurved. *Stamens* inserted with the petals. *Disk* fleshy, 5-lobed. *Ovary* free, glabrous or puberulous at the base, crowned at the top with a tuft of hairs; styles 2 filiform, stigmas small capitate; ovules 2 in each cell, erect. *Capsule* entire or 2-lobed, 1–2-celled, dehiscing slowly with 2 valves, 1–2-seeded. *Seeds* erect, completely or partially covered by a fleshy aril, albumen abundant fleshy; cotyledons linear-oblong.—DISTRIB. India, Ceylon, Malayan Peninsula.

* *Flowers in simple spikes.*

1. **K. pulcherrima,** *Wall. Cat.* 4334; petals elliptic-oblong $\frac{1}{12}$ in., disk slightly puberulous forming a shallow crenate cup round the glabrous base of the ovary. fruit narrowly oblong. K. calophylla, *Wall. Cat.* 4335. K. robusta, *Kurz mss.* Rhesa Moja, *Ham. mss. ex Arn. in Ed. Phil. Journ* xvi. 315; *Walp. Rep.* i. 538. Celastrus robustus, *Roxb. Fl. Ind.* i. 626. Nothocnestis sumatrana, *Miq. Fl. Ind. Bat. Suppl.* i. 531.

The KHASIA MTS., SILHET and CHITTAGONG; ascending to 3000 ft.; BIRMA, *Griffith; TENASSERIM, *Helfer;* SINGAPORE, *Wallich.*—DISTRIB. Sumatra.

A tree. *Leaves* 4–7 by 1–2 in., oblong-lanceolate, acute or acuminate, glossy above. *Spikes* glabrous. *Fruit* 1½–2 in., the apex often produced into a beak, 1-celled, 1-seeded.

2. **K. Maingayi,** *Laws.;* petals $\frac{1}{10}$ in. linear-oblong, disk puberulous forming a crenate cup round the puberulous ovary, fruit broadly oblong acute.

SINGAPORE, *Maingay.*

A tree. *Leaves* 5–9 by 3½–4 in., elliptic-oblong. *Spikes* glaucous. *Fruit* 1–1½ in.—Closely allied to the last species, of which it may prove to be a variety.

** *Flowers in panicled spikes or racemes.*

3. **K. paniculata,** *Wall. Cat.* 4336; fruit ¾ in. unequally 2-lobed, lobes diverging. Rhesa paniculata, *Arn. in Ed. Phil. Journ.* xvi. 315; *Walp. Rep.* i. 538. Trochisandra indica, *Bedd. Fl. Sylv.* t. 120; *Fl. Sylv. Anal. Gen.* lxvii. Pyrospermum calophyllum, *Miq. Fl. Ind. Bat. Suppl.* i. 402.

PENANG, *Wallich,* &c.; SINGAPORE, *Maingay;* abundant in Anamallay Hills, *Beddome*—DISTRIB. Sumatra.

A tree. *Leaves* elliptic-oblong, 6–12 by 2–3 in. *Flowers* shortly pedicellate, in stoutish paniculate racemes. *Petals* obovate-oblong, flat. *Disk* lobed, glabrous. *Ovary* glabrous beneath the tuft of hairs. *Fruit* with the smaller lobe abortive, the larger 1-seeded.—I have seen no specimen of Beddome's *Trochisandra indica,* but from his description and figure I am not able to distinguish it from the above.

4. **K. bipartita,** *Laws.;* fruit 1¼ in. divided nearly to the base into 2 equal nearly parallel lobes.

WESTERN PENINSULA; Shivagherry hills, *Wight.*

Leaves 3–8 by 1¾–3 in., elliptic-oblong. *Panicles* stoutish. *Flowers?* *Fruit-lobes* narrowly oblong, rounded at the apex, black, 1-seeded. *Seed* not half covered by the aril.

5. **K. ceylanica,** *Arn. Pug. in Act. Acad. Nat. Cur.* xviii. pt. i. 328; fruit ¾ in. elliptic or elliptic-oblong not lobed. *Thwaites Enum.* 72; *Bedd. Fl. Sylv.* t. 147.

CEYLON; warm moist parts of the island.

A large tree. *Leaves* 3–6 by $\frac{1}{2}$–3 in., ovate or ovate-oblong, acute, the apex often reflexed. *Flowers* sessile, in slender panicled spikes. *Petals* elliptic, $\frac{1}{24}$ in. *Fruit* reddish brown, 1-celled, 1-seeded. *Seed* nearly covered by the aril.

VAR. montana, *Thwaites, l.c.;* panicles smaller and more succulent, flowers larger.—Central province, ascending to 5000 ft.

10. **ELÆODENDRON,** Jacq. f.

Small trees or shrubs. *Leaves* opposite or subopposite, crenate or entire. *Flowers* in axillary dichotomous cymes, often polygamous. *Calyx* 5-cleft. *Petals* 5, spreading. *Disk* thick. *Stamens* 5; anthers nearly globose. *Ovary* continuous with the disk, conical, rarely 2–4- or 5-celled; style very short; ovules 2 in each cell. *Fruit* succulent or dry, 1–2-celled, indehiscent; cells 1- rarely 2-seeded. *Seed* without an aril, albuminous.—DISTRIB. About 30 species, natives of South Africa, Tropical Asia, America and Australia.

1. **E. glaucum,** *Pers. Synops.* i. 241; *Roxb. Fl. Ind.* i. 638; *Wall. Cat.* 4325; *DC. Prodr.* ii. 10; *Thwaites Enum.* 73; *Bedd. Fl. Sylv. Anal. Gen.* lxvii. E. Roxburghii, *W. & A. Prodr.* 157; *Grah. Cat. Bomb. Pl.* 38; *Dalz. & Gibs. Bomb. Fl.* 48; *Wight Ill.* 178, t. 71; *Bedd. Fl. Sylv. Anal. Gen.* 67; *Fl. Sylv.* 148; *Brand. For. Fl.* 82. E. paniculatum, *W. & A. Prodr.* 157. E. oxyodon, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, pt. i. 603. Celastrus glaucus, *Vahl Symb.* ii. 42. Mangifera glauca, *Rottb. in Nov. Act. Harn.* ii. 534, t. 4, f. i. Euonymus grossa, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 408; *Cat.* 4291. E. Tina, *Ham. in Wall. Cat.* 4292. Neerija dichotoma, *Roxb. Fl. Ind.* i. 646. Rhamnus Neerija, *Spreng. Syst. Veg. Suppl.* 86. Schrebera albens, *Willd. Sp. Pl.* i. 1092.

Throughout the hotter parts of INDIA and CEYLON.—DISTRIB. Malay Archipelago.

Leaves 2–6 by $\frac{3}{4}$–2$\frac{1}{2}$ in., elliptic or ovate, acute or acuminate, crenate or nearly entire, membranous or subcoriaceous. *Flowers* in diffuse dichotomous cymes. *Fruit* woody, obovoid, $\frac{1}{2}$ in., tipped at the apex with the persistent style, 1-celled, 1-seeded.—So far as foliage is concerned this is a most variable species.

VAR. 1. montanum, *Thwaites Enum.* 73; fruit $\frac{1}{2}$ in. globose very hard and woody 1-celled 1-seeded brown.—CEYLON, in hot drier parts of the Island.

VAR. 2. leaves 2$\frac{1}{2}$ by 1 in. oblong-elliptic subacuminate, fruit $\frac{1}{3}$ in. round succulent 2-celled black.—Canara, *Ritchie.*

11. **HIPPOCRATEA,** Linn.

Small trees or scandent shrubs. *Leaves* opposite, petioled; stipules small, caducous. *Flowers* small, white or greenish, disposed in axillary cymes, more rarely in terminal cymose panicles. *Calyx* small, 5-parted. *Petals* 5, spreading, much larger than the calyx, imbricate or valvate. *Stamens* 3, recurved, lying in the grooves of the ovary. *Disk* conical or cupular. *Ovary* surrounded by the disk, 3-celled; style very short or 0, stigmas 1–3; ovules 2–10 in each cell, in 2-series, inserted on the inner angle. *Fruit* of 3-flattened carpels connate at the base, usually dehiscent. *Seeds* compressed, usually winged below, exalbuminous.—DISTRIB. Species about 60, natives of the tropics of both hemispheres.

* *Petals $\frac{1}{6}$–$\frac{1}{3}$ in.—Shrubs with climbing branches.*

1. **H. obtusifolia,** *Roxb. Fl. Ind.* i. 166; calyx-lobes triangular, petals $\frac{1}{5}$ in. subulate puberulous. *W. & A. Prodr.* 104; *Wight Ill.* i. 134; *Ic.* t. 936; *DC. Prodr.* i. 569; *Thwaites Enum.* 52. H. barbata, *F. Muell.*

in Trans. Phil. Inst. Vict. iii. 23. H. ?grandiflora, *Wall. Cat.* 4213. H. rigida, *Hamp.* H. tortuosa, *Wall. Cat.* 4216. H. volubilis, *Heyne in Wall. Cat.* 4215 (*not of Linnæus*). Salacia lævigata, *Wight in Hook. Bot. Misc.* iii. 295; *Suppl.* t. xxxvi. (*non DC.*).

EASTERN and WESTERN PENINSULAS, from Tenasserim and the Concan southwards. SILHET, *Wallich.*—DISTRIB. Malay Archipelago, China, Australia, tropical Africa.

A climbing shrub; young branches often quadrangular. *Leaves* 2–5 by 1–2½ in., elliptic or oblong, obtuse, acute or shortly acuminate, crenate-serrate or entire, glabrous, coriaceous. *Flowers* in dichotomous cymes shorter than the leaves. *Calyx-lobes* entire. *Disk* puberulous. *Ovules* 6 in each cell. *Carpels* 1½–2 in., obovoid, emarginate, striate, 4–6-seeded.

2. **H. Cumingii,** *Laws.*; calyx-lobes round, petals ⅓ in. subulate puberulous outside inside covered with rust-coloured hairs for the upper three-fourths glabrous below.

MALACCA, *Griffith.*—DISTRIB. Philippines.

A climbing shrub. *Leaves* 3–4 by 1½–2 in., elliptic, acute or subacuminate, glabrous, coriaceous, entire. *Flowers* in dichotomous cymes shorter than the leaves. *Calyx-lobes* very short, glabrous, entire. *Disk* with a ring of hairs at the base of the stamens, otherwise glabrous. *Fruit?*

3. **H. Lobbii,** *Laws.*; calyx-lobes elliptic-oblong, petals elliptic-ovate slightly cohering at the base entirely covered on the inside with dense cinereous hairs.

TENASSERIM; at Moulmein, *Lobb.*

A climbing shrub? *Leaves* 3–4 by ¾–2 in., broadly elliptic, subacuminate, entirely glabrous. *Cymes* 2–3 times divided, shorter than the leaves. *Calyx-lobes* entire, pubescent. *Petals* ⅛ in. *Anthers* almost sessile. *Fruit?*

4. **H. Arnottiana,** *Wight Ill.* i. 133, t. 46–47; calyx-lobes orbicular-ovate, petals ¼ in. shortly clawed cordate very concave with involute margins. Salacia terminalis, *Thwaites Enum.* 407.

WESTERN PENINSULA; Quilon, *Wight;* Canara, *Plant. Hohenacker.* CEYLON, near Galle, *Thwaites.*

A climbing shrub, glabrous in every part. *Leaves* 3–3 by 1½–2¾ in., elliptic, acute or subacuminate, very coriaceous, entire or faintly crenate, glabrous. *Cymes* axillary or panicled. *Calyx-lobes* entire. *Fruit* 2½ in., oblong, emarginate.

** *Flowers very numerous. Petals* $\frac{1}{12}$ *in. or less.—Shrubs with climbing branches.*

5. **H. Grahami,** *Wight Ill.* i. 134; *Ic.* t. 380; cymes diffuse panicled longer than the leaves, calyx-lobes orbicular sharply crenate. *Dalz. & Gibs. Bomb. Fl.* 32. H. lanceolata, *Wall. Cat.* 4214. Salacia paniculata, *Wall. Cat.* 4214, B *in part.*

WESTERN PENINSULA; from the Concan southwards, *Wight,* &c. ? ASSAM and ? SILHET, *Wallich.*

A climbing shrub. *Leaves* 3–5 by 1¾–2 in., ovate-elliptic, acute or subacuminate, entire, coriaceous, glabrous. *Petals* $\frac{1}{12}$ in., very shortly clawed, linear-oblong, glabrous. *Anthers* subsessile. *Disk* glabrous. *Fruit* 3 by ¾ in., linear-oblong, emarginate.

VAR. Leaves 4 in. lanceolate-acuminate, flowers in slender divaricating panicles twice the length of the leaves, fruit 2¾ in. narrowly elliptic.—Assam, *Griffith.*

6. **H. indica,** *Willd. Sp. Pl.* i. 193; leaves 1½–2½ by ¾–1½ in., cymes very slender dichotomous shorter than the leaves, calyx-lobes triangular entire, fruit 1–1½ in. *DC. Prodr.* i. 568; *Roxb. Fl. Ind.* i. 165; *Cor. Pl.* ii. t. 130;

W. & A. Prodr. 104; *Dalz. & Gibs. Bomb. Fl.* 32; *Thwaites Enum.* 52; *Oliv. Fl. Trop. Afr.* i. 368; *Brand. For. Fl.* 83. H. disperma, *Vahl Enum.* ii. 28; *Wall. Cat.* 4210 *in part.* H. euonymoides, *Vahl Enum.* ii. 28. H. obtusifolia, *Roxb. Wall. Cat.* 4211. Tonsella disperma, *Poir.*—Celastrinea ? *Wall. Cat.* 9013.

In the hotter parts of INDIA from Behar, the Concan, and Tenasserim southwards, and in CEYLON.—DISTRIB. Malay Archipelago and Africa.

A shrub with climbing branches. *Leaves* ovate or elliptic-ovate, acute or subacuminate or lanceolate, finely serrate, membranous, glabrous. *Flowers* glabrous, exceedingly small. *Cymes* many times divided; partial cymes subumbellate. *Petals* $\frac{1}{24}$ in., usually 6, elliptic oval-oblong, concave. *Ovules* 2–4 in each cell. *Fruit* oblong. *Wall. Cat.* 4111 B? is evidently the same plant.

7. **H. arborea**, *Roxb. Hort. Beng.* 5; *Fl. Ind.* i. 167; *Cor. Pl.* t. 205; leaves 4–7 by 2½–3¼ in., cymes and fruit 3 in. *Wall. Cat.* 4212; *DC. Prodr.* 569; *Brand. For. Fl.* 83. ? H. disperma, *Wall. Cat.* 4212 B.

Interior parts of INDIA, *Roxb.*; BHOTAN and the KHASIA MTS., *Griffith*? Morung Mts., *Hamilton.*

Subarboreous, with climbing branches. *Leaves* ovate-elliptic, subacuminate, serrate, membranous, glabrous. *Fruit* of 3 carpels, cuneiform, 3 by 1½ in.—This ought probably to be considered a variety of *H. indica*, from which it differs apparently in nothing but size. In the description given by Roxburgh of *H. obtusifolia* (Fl. Ind. i. 166) the flowers are those of *H. indica* proper, while the leaves belong to *H. obtusifolia*, Wight.

*** *Erect trees.*

8. **H. Maingayi,** *Laws.*; cymes 3-flowered, racemose.

MALACCA, *Maingay.*—DISTRIB. ? Borneo.

Branches terete. *Leaves* 3 by ¾ in., lanceolate, glabrous, coriaceous. *Carpels* triquetrous, 4–5 in., woody. *Seeds* 3½–4½ in., oblong.

12. SALACIA, Linn.

Scandent or sarmentose shrubs or small trees. *Leaves* opposite, petiolate, exstipulate. *Flowers* few or many, clustered in the axils of the leaves or extra-axillary, more rarely in cymes. *Calyx* small, 5-parted, *Petals* 5, imbricate. *Stamens* 3, rarely 2 or 4, continuous with the disk, recurved. *Ovary* conical, immersed in the disk, 3-celled; style very short, stigma simple or 3-lobed; ovules 2–8 in each cell, in 1–2 series, inserted on the inner angle. *Fruit* baccate, 1–3-celled, sub-woody or fleshy. *Seeds* large, angular. —DISTRIB. Species about 70, natives of the tropics of both hemispheres.

* Flowers 1–6 from an axillary or extra-axillary tubercle.

a. Leaves coriaceous mostly 6–12 *in.*

1. **S. flavescens,** *Kurz in Journ. As. Soc. Beng.* 1872, pt. ii. 300; leaves 6–12 by 2–3½ in. oblong-lanceolate acute or subacuminate margins recurved, flowers about 3 very small. Dryptopetalum coriaceum, *Arn. in Ann. Nat. Hist.* i. 373. Microtropis coriacea, *Wall. Cat.* 4338. M. longifolia, *Wall. Cat.* 4339, *in part.*

EASTERN PENINSULA, from Tenasserim, *Gomez*, &c., to Penang, *Wallich*, &c.

A small tree with black branches. *Leaves* green glabrous and shining above, paler beneath, drying light-yellow. *Flowers* axillary and extra-axillary, sessile or on pedicels under ⅛ in. *Fruit?* The dark stems and light-coloured leaves, together with a general aspect of a *Microtropis*, serve to distinguish this species from its allies.

2. **S. longifolia,** *Hook. f. mss.* (*not Wall.*); leaves 6–14 by 2–4 in. elliptic-lanceolate acute or subacuminate margins recurved, flowers 3–6 large.

MALAY, *Maingay;* Penang, *Phillips;* Prince of Wales Island?
A small tree with rather coarse pale-coloured branches. *Leaves* pale-brown when dry, glabrous, coriaceous, shining beneath and finely reticulated. *Flowers* axillary or extra-axillary, usually sessile but sometimes on pedicels ⅛–⅓ in. *Petals* obovate, ⅙–¼ in.

3. **S. grandiflora,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 300; leaves 6–12 by 2½–4 in. oblong with a short obtusely-cuspidate reflexed apex margins recurved, flowers large.

TENASSERIM, *Kurz;* MALACCA, *Griff.* and *Maingay;* PENANG, *Phillips.*
A small tree. *Leaves* very coriaceous, glabrous and shining, finely reticulated. *Flowers* 1–3 axillary and extra-axillary, sessile or very shortly pedicellate, the largest in the genus. *Petals* ⅓ in., roundly obovate. *Fruit* 1–2 in. diam., black, smooth.—Closely allied to *S. longifolia,* of which it is perhaps only a variety. Maingay's specimen, No. 401, from Malacca, has pale-green leaves and a rough light-coloured fruit; it is perhaps a distinct species.]

b. Leaves coriaceous 1½–5 *in. rarely more.*

4. **S. Maingayi,** *Laws.*; leaves 1½–2 by 1¼ in. ovate subacute entire, flowers 1–3 in each axil thick and fleshy, pedicels stout ½–¾ in., petals ⅛ in. roundly-oblong.

PENANG, *Maingay.*
A scandent shrub. *Branches* terete, rough with minute tubercular warts. *Leaves* very coriaceous, drying black. *Fruit?*

5. **S. Lobbii,** *Laws.*; leaves 3–3½ by 1–1¾ in. elliptic-oblong with a short obtuse point entire, flowers 1–3 in each axil thick and fleshy, pedicels stout 1–1½ in., petals ¼ in. roundly ovate subcordate at the base.

SINGAPORE, *Lobb.*
An erect shrub. *Branches* terete, covered with minute warts. *Leaves* not drying black. *Fruit?*

6. **S. prinoides,** *DC. Prodr.* i. 571; leaves 1½–3 by ¾–1¼ in. oblong obtusely acuminate serrate, flowers 3–6 from each tubercle, pedicels under ½ in., petals ⅛ in. broadly ovate, fruit the size of a small cherry smooth. *Wall. Cat.* 4219; *W. & A. Prodr.* 105; *Dalz. & Gibs. Bomb. Fl.* 33. S. podopetala, *Turcz. in Bull. Soc. Nat. Mosc.* 1863, i. 581. S. Wightiana, *Wall. Cat.* 4221. Johnia coromandeliana, *Roxb. Fl. Ind.* i. 169; *DC. Prodr.* i. 571. Tonsella prinoides, *Willd. in Act. Ac. Cur. Ber.* iv. 184.

SILHET and the KHASIA MTS., *H. f. & T.;* EASTERN and WESTERN PENINSULA, and CEYLON.—DISTRIB. Java and the Philippine Islands.
A small straggling tree or large climbing shrub. *Leaves* very coriaceous. *Flowers* mostly axillary. *Sepals* puberulous, ciliate. *Petals* unguiculate, entire. *Fruit* globose, 1-celled, 1-seeded, black.

7. **S. Brunoniana,** *W. & A. Prodr.* 105; leaves 2–3 by ¾–1 in. oblong or elliptic obtuse or with a short obtuse acumination faintly serrate, flowers 1–2 in each axil, pedicels under ½ in. slender, petals ⅛ in. ovate from a broad base margins incurved when dry. *Wall. Cat.* 4217 E?; *Dalz. & Gibs. Bomb. Fl.* 33.

WESTERN PENINSULA, *Hb. Wight;* Ram Ghaut, *Dalzel & Gibson.*
A scandent shrub with black rigid divaricating branches, rough with minute reddish

warts. *Leaves* black when dry. *Fruit?—S. Finlaysonii*, Wall. Cat. 4220, which appears to be nearly allied to this species, is not Indian.

8. **S. Roxburghii,** *Wall. Cat.* 4217; leaves 3–6 by $\frac{3}{4}$–2 in. oblong-lanceolate or elliptic-oblong caudate-acuminate entire or very faintly serrate, flowers 3–6 in each axil, pedicels under $\frac{1}{3}$ in. petals $\frac{1}{12}$ in. roundly obovate, fruit $1\frac{3}{4}$–2 in. diam. smooth. *W. & A. Prodr.* 105; *Dalz. & Gibs. Bomb. Fl.* 33. ? S. chinensis, *L.; DC. Prodr.* 571. ? S. cochinchinensis, *Lour. DC. Prodr.* i. 571. ? Indeterminata, *Wall. Cat.* 4291. Johnia salacioides, *Roxb. Fl. Ind.* i. 168; *DC. Prodr.* i. 571.

A scandent shrub. *Branches* pale-brown with wrinkled bark. *Sepals* glabrous, entire. *Fruit* globose, 2–3-seeded.—This is the true *S. Roxburghii* of Wall. Cat., and seems to be confined to the N.E. of India, so that the specimen in *Hyne's* Herbarium alluded to by *Wight & Arnott* was probably not of his own gathering.

9. **S. ovalis,** *Laws.*; leaves 3–4 by $1\frac{1}{2}$–2 in. elliptic-obtuse or rounded at both ends entire, flowers 3–6 in each axil, pedicels under $\frac{1}{3}$ in. slender, petals $\frac{1}{12}$ in. ovate.

MALACCA, *Maingay.*
A scandent shrub with smooth black pruinose branches. *Leaves* subcoriaceous, pale-coloured. *Fruit?*

10. **S. rubra,** *Laws.*; leaves 2–3 by 1–$1\frac{1}{4}$ in. elliptic-lanceolate pointed at both ends entire, fruit $1\frac{1}{2}$ in. diam. rugose bright red.

MALACCA, *Maingay.*
A scandent? shrub with coarse pale-coloured branches. *Flowers?* *Fruit* 2-seeded.

11. **S. reticulata,** *Wight Ill.* i. 134; leaves $2\frac{1}{2}$–4 by 1–$2\frac{1}{4}$ in. elliptic or subovate rounded at the apex or with a short obtuse point very faintly serrate or entire shining above finely reticulated beneath, flowers 6 in each axil, pedicels under $\frac{1}{2}$ in., petals ovate acute $\frac{1}{6}$ in., fruit 2 in. diam. tuberculate. *Thwaites Enum.* 53.

WESTERN PENINSULA; Quilon, *Wight;* CEYLON, ascending to 3000 ft.
A scandent shrub with blackish branches. *Sepals* glabrous, entire.
VAR. *diandra*, Thwaites Enum, 53 (sp.); leaves smaller, less coriaceous; stamens 2.

c. *Leaves membranous.*

12. **S. membranacea,** *Laws.*; leaves 3–6 by 1–2 in. elliptic entire.

Sikkim, *Herb. Griffith;* Khasia, 2–3000 ft., *H. f. & T.*
A scandent shrub with slender stems and branches. *Branches* completely covered with minute pale-coloured warts. *Leaves* flat, shining, and very finely reticulated on both sides. *Flowers?* *Fruit* $1\frac{1}{2}$ in. diam., green. *Seeds* yellow in a subfleshy pulp.—Apparently intermediate between *S. Roxburghii* and *S. viminea*, but approaching the latter most closely.

13. **S.? viminea,** *Wall. Cat.* 7267; leaves 3–5 by 1–2 in. elliptic-lanceolate obtusely subacuminate crenate.

MERGUI, *Griffith;* Moulmein, *Griffith;* Tenasserim and Andaman, *Helfer.*
A scandent shrub? with exceedingly slender branches. *Leaves* shining above, finely reticulated beneath. *Flowers* 1–3 together, axillary or extra-axillary, flat, membranous or submembranous. *Pedicels* $\frac{1}{12}$–$\frac{1}{3}$ in., very slender. *Fruit?*

** Flowers very numerous from an axillary or extra-axillary tubercle.

14. **S. multiflora,** *Wight Ill.* i. 134; whole plant pale-coloured, pedicels 1 in. very slender.

Tenasserim, at Mergui, *Griffith.*

A scandent? shrub, with very light-coloured branches and leaves. *Leaves* 6–9 by $2\frac{3}{4}$–4 in., elliptic-oblong, acute, entire, margins slightly recurved, membranous or subcoriaceous. *Petals* $\frac{1}{8}$ in., orbicular. *Ovules* about 8 in each cell. *Fruit* ?—Resembling *S. flavescens*, but readily distinguished by its numerous flowers and long slender pedicels.

15. **S. verrucosa,** *Wight Ill.* i. 134; whole plant drying nearly black, branches covered with minute rough warts, pedicels slender $\frac{1}{2}$–1 in. S. memecyloides, *Wall. Cat.* 4218.

Tenasserim, at Moulmein and Mergui, *Griffith, &c.*—Distrib. Philippine Islands.

A shrub. *Leaves* $3\frac{1}{2}$–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., elliptic-oblong or broadly lanceolate, obtuse at the apex or with a short obtuse acumen, entire or faintly serrate, very coriaceous. *Flowers* from chiefly extra-axillary tubercles. *Calyx-lobes* fringed with rust-coloured hairs. *Petals* $\frac{1}{8}$ in., oblong-ovate, obtuse. *Ovules* 2 in each cell. *Fruit* $\frac{3}{4}$ in. diam., subglobose, smooth, black.

16. **S. macrosperma,** *Wight Ic.* t. 962; whole plant drying nearly black, branches without warts, pedicels stoutish usually under $\frac{1}{2}$ in.

Western Peninsula, from the Concan southwards.

A diffuse rambling shrub. *Leaves* $3\frac{1}{2}$–5 by $1\frac{1}{2}$–$2\frac{1}{2}$ in., oblong-elliptic, shortly and obtusely acuminate, entire, very coriaceous. *Flowers* chiefly from extra-axillary tubercles. *Calyx-lobes* fringed with rust-coloured hairs. *Petals* rather smaller than in *S. verrucosa*, ovate, obtuse from a broad base. *Ovules* 2 in each cell. *Fruit* 1–$1\frac{1}{2}$ in. diam., globose, rugulose, black.—Wight says that the calyx-lobes are not fringed in this species, but in some of his own specimens they are distinctly ciliated. Very closely indeed allied to *S. verrucosa.*

*** Peduncles under $\frac{1}{4}$ in. 3-flowered.

17. **S. oblonga,** *Wall. Cat.* 4226; *W. & A. Prodr.* 106; *Wight Ill.* t. 47 B; *Thwaites Enum.* 53; *Dalz. & Gibs. Bomb. Fl.* 33; *Bedd. Fl. Sylv. Anal. Gen.* lxvii. t. x. iv. S. oppositifolia, *Rottl.*; *Wight Ic.* t. 97. S. pomifera, *Wall. Cat.* 4227, *not W. & A.*

Western Peninsula; from the Concan southwards. Ceylon, in the hotter parts of the island.

A small glabrous tree or shrub. *Leaves* 3–6 by $1\frac{1}{4}$–2 in., elliptic-oblong, rounded at the apex or with a very short obtuse acumen, slightly serrate, subcoriaceous, turning yellow when dry. *Flowers* sometimes sessile in the axils of the leaves owing to the extreme shortness of the common peduncle. *Calyx-lobes* rounded, glabrous, entire. *Petals* about $\frac{1}{8}$ in., broadly elliptic, serrate. *Ovules* 4 in each cell. *Fruit* 2–$2\frac{1}{2}$ in. diam., tuberculate, light-brown. *Seeds* about 8.

**** Flowers in branching cymes.

18. **S. fruticosa,** *Heyne in Wall. Cat.* 4223 (under Tonsella); flowers in dichotomously branched cymes $\frac{3}{4}$ in.

Western Peninsula; Canara, *Herb. Hohenacker, Kurz, Rottler.*

A scandent shrub. *Leaves* $3\frac{1}{2}$ by $1\frac{1}{2}$ in., elliptic-lanceolate, acute, or shortly and obtusely acuminate, serrate, chartaceous. *Petals* $\frac{1}{12}$ in. diam., orbicular, with a white border. *Fruit* ?—Closely allied to *S. floribunda*, of which it may be a variety.

19. **S. Griffithii,** *Laws.*; flowers in divaricating cymes 4 in. long.

Habitat unknown.—*Herb. Griffith.*

Leaves 3–5 by $1\frac{1}{4}$–2 in., oblong-elliptic, shortly acuminate, crenate-serrate, subcoriaceous. *Petals* ovate-oblong, obtuse. *Ovules* 2, superposed. *Fruit* ?

20. **S. floribunda,** *Wight Ill.* i. 134; flowers small umbellate in di-trichotomous cymes. S. densiflora, *Wall. Cat.* 4224. S. longifolia, *Wall. Cat.* 4225. S. pomifera, *W. & A. Prodr.* 105. ? *non Wall.*

SILHET, *De Silva;* ASSAM and the KHASIA MTS., *Griffith,* &c.; TENASSERIM, at Mergui, *Griffith.*

A scandent shrub. *Leaves* 3–6 by ¾–2¾ in., elliptic-lanceolate, shortly and obtusely acuminate, serrate, subcoriaceous, shining. *Petals* orbicular. *Ovules* 2 in each cell. *Fruit* 1½ in. diam., globose, black.

DOUBTFUL SPECIES.

S. latifolia, *Wall. Cat.* 4222; leaves 2½–3 by 1¾–2 in., flowers? fruit ripe? the size of a cherry pyriform smooth.

SINGAPORE, *Wallich.*

13. SIPHONODON, Griff.

A small glabrous tree. *Leaves* alternate, shortly petiolate, entire or crenate; stipules minute, deciduous. *Peduncles* axillary, short, 3–4-flowered. *Calyx* 5-cleft. *Petals* 5, spreading. *Disk* not distinct from the base of the calyx. *Stamens* 5, connivent round the pistil, filaments flattened. *Ovary* half immersed in the disk, conical, the summit hollowed out and stigmatose in the cavity round a central column, cells numerous in 2–4 series; ovules solitary in each cell, ascending and pendulous. *Drupe* globose, hard and fleshy, with numerous 1-seeded bony stones superposed in rings round the central axis, testa membranous, albumen sub-horny.—DISTRIB. Species 2; Malayan Peninsula, Java, Australia.

Mr. Bentham in his Flora Australiensis remarks that the ovary must probably be regarded as being 5-celled, with many ovules in each cell separated by spurious transverse dissepiments.

1. **S. celastrineus,** *Griff. in Calc. Journ. Nat. Hist.* iv. 247, t. 14; *Wall. Cat.* 9019; *Miq. Fl. Ind. Bat.* i. pt. ii. 592; *Hook. f. in Trans. Linn. Soc.* xxii. t. 26. Astrogyne coriacea, *Wall. mss.*

PEGU, *Kurz;* PENANG, *Griffith.*—DISTRIB. Java.

Leaves 4–8 by 2–2½ in., oblong or oblong-elliptic, acute or subacuminate, crenate-serrate, coriaceous. *Peduncles* under 1 in. *Flowers* yellowish. *Fruit* globose, 1–1½ in.

ORDER XLII. RHAMNEÆ. (By M. A. Lawson, M.A., F.L.S.)

Shrubs or trees, erect or scandent (cirrhose in *Gouania*). *Branches* unarmed spinous or aculeate. *Leaves* simple, alternate (opposite or subopposite in *Scutia* and *Sageretia*) usually coriaceous, often 3–5-nerved; stipules small, deciduous or changed into prickles. *Flowers* hermaphrodite or polygamous, small, greenish, in lax or dense axillary cymes, which are solitary or disposed in spikes or panicles. *Calyx* 4–5-fid; lobes triangular, erect or recurved, usually carinate within, valvate. *Petals* 4–5, rarely 0, inserted on the throat of the calyx-tube, usually shorter than its lobes, cucullate or involute. *Stamens* 4–5, inserted with the petals and opposite to them, often enclosed within their folds; anthers versatile, 2-celled, dehiscing longitudinally. *Disk* fleshy and filling the calyx-tube, or thin and lining it, entire or lobed, glabrous, rarely tomentose. *Ovary* sessile, free or immersed in the disk, wholly free from the calyx-tube or more or less adherent to it, 3- rarely 2–4-celled; style short, simple, or 2–4 cleft; ovules 1 in each cell, erect, anatropous, raphe dorsal. *Fruit* free or girt at the base or middle by the adhering calyx-tube, 3- more rarely 1–4-celled, capsular or a dry or fleshy drupe, sometimes winged. *Seed* with fleshy albumen, rarely exalbuminous; embryo large, erect.—DISTRIB. Abundant in the tropical and temperate regions of the world; genera 38, species above 400.

VITMANNIA AFRICANA, *W. & A. Prodr.* 166; *W. Ic.* 490, is a S. African plant, not Indian.

TRIBE I. **Ventilagineæ.** Scandent unarmed shrubs. *Leaves* alternate. *Disk* filling the calyx-tube. *Ovary* superior or half superior. *Fruit* dry, 1-celled, 1-seeded, girt at the base or middle by the calyx-tube. *Seed* exalbuminous.

Fruit indehiscent, prolonged above into a linear-oblong wing . . .	1. VENTILAGO.
Fruit a 2-valved broadly oblong capsule	2. SMYTHEA.

TRIBE II. **Zizypheæ.** Shrubs or trees. *Disk* filling the calyx-tube. *Fruit* a dry or fleshy drupe with a 1–3-celled stone.

Leaves prominently 3-nerved	3. ZIZYPHUS.
Leaves penninerved	4. BERCHEMIA.

TRIBE III. **Rhamneæ.** Shrubs or trees. *Disk* lining or filling the calyx-tube. *Ovary* superior or half-superior. *Fruit* dry or fleshy, of 3 (rarely 2 or 4) pyrenes or cocci.

* *Disk thin, lining the calyx-tube.*

Trees or shrubs. Leaves alternate. Cymes axillary. Fruit indehiscent	5. RHAMNUS.

** *Disk fleshy, filling the calyx-tube.*

Leaves alternate, unequal. Peduncles swollen, fleshy. An unarmed tree	6. HOVENIA.
Leaves opposite or subopposite. Flowers subumbellate. An unarmed or prickly shrub	7. SCUTIA.
Leaves opposite or subopposite. Flowers sessile in terminal panicles. Unarmed or spinous shrubs	8. SAGERETIA.
Leaves alternate. Peduncles slender, not fleshy. An unarmed shrub	9. COLUBRINA.

TRIBE IV. **Gouanieæ.** Fruit inferior, crowned with the persistent calyx.

Fruit globose, not winged. Flowers fascicled, forming paniculate racemes	10. APTERON.
Fruit 3-winged. Flowers fascicled, forming paniculate racemes . .	11. GOUANIA.
Fruit ovate, terete. Flowers subumbellate	12. HELINUS.

1. VENTILAGO, Gærtn.

Scandent shrubs. *Leaves* alternate, subbifarious. *Flowers* small, disposed in axillary and terminal (usually leafless) panicles, rarely in the axils of the leaves. *Calyx* 5-fid, with spreading internally keeled lobes; calyx-tube obconical. *Petals* 5, obtriangular or cucullate. *Stamens* 5, adnate to the base of the petals. *Disk* 5-lobed with a free margin. *Ovary* sunk in the disk, 2-celled; style very short. *Fruit* samaroid, the nut subglobose, girt at the base or middle by the adhering calyx-tube, prolonged above into a linear or linear-oblong coriaceous wing, 1-celled, 1-seeded. *Seed* subglobose, exalbuminous.—Distrib. Species about 10, scattered over the tropics of Asia, Africa, America, Australia, and the Pacific Islands.

1. **V. madraspatana,** *Gærtn. Fruct.* i. 223, t. 49, f. 2; flowers in slender simple or paniculate spikes, fruit 1½–2 by ⅔ in., nut girt at the base. *W. & A. Prodr.* 164; *Wight Ic.* 163; *Wall. Cat.* 4268; *Dalz. & Gibs. Bomb. Fl.* 48; *Thwaites Enum.* 74; *Brandis For. Fl.* 96. V. bracteata, *Wall. Cat.* 4269.

Western Peninsula, from the Concan southwards; Tenasserim, at Moulmein and Mergui, *Griffith*, &c.; Ceylon, common in hot dry places.—Distrib. Java.

Young branches and leaves glabrous or only slightly pubescent. *Leaves* 2–4 by 1–1½ in., oblong-lanceolate to ovate, acute or subacuminate, crenate or entire; costal nerves 6–8 pair. *Calyx* slightly puberulous outside, glabrous inside. *Ovary* with a few white hairs at the base; styles nearly straight.

2. **V. calyculata,** *Tulasne in Ann. Sc. Nat. Ser.* 4, viii. 124; flowers in densely pubescent paniculate spikes, fruit 1½–2 by ⅔ in. pubescent, nut girt round the middle. *Brandis For. Fl.* 96. V. denticulata, *Willd. Nov. Act. Ber.* iii. 417; *DC. Prodr.* ii. 38. V. macrantha, *Tulasne in Ann. Sc. Nat. Ser.* 4, viii. 123. V. madraspatana, *Roxb. Fl. Ind.* i. 629; *Cor. Pl.* i. 55, t. 76; *Wall. Cat.* 4268 *b; W. & A. Prodr.* 164 *not of Gærtn.* V. silhetiana, Smithiana, *and* sulphurea, *Tulasne in Ann. Sc. Nat. Ser.* iv.–viii. 125.

Throughout the hotter parts of India, from the Kumaon Himalaya and Nipal, to Bhotan, Silhet, Tenasserim, and throughout the Western Peninsula.—Distrib. Java.

Leaves pubescent, 3½–6 by ½–2½ in., ovate or ovate-elliptic, crenate-serrate, with about 6 pairs of costal nerves. *Calyx* densely pubescent without, hairy within on the disk. *Ovary* densely pubescent; styles longer than in *V. madraspatana* and more diverging. *Fruit* yellow, often densely pubescent, at length nearly glabrous.—A variable plant so far as the size of the leaves and amount of pubescence go.

3. **V. Maingayi,** *Laws.*; flowers in long filiform simple or compound spikes, fruit 3 by ¾ in. glabrous girt below the middle. V. Sp.; *Griff. Notul.* iv. 492.

Tenasserim, *Helfer*, at Mergui, *Griffith;* Malacca, *Maingay.*

Leaves 4–7 by 1–2 in., oblong-lanceolate, entire, coriaceous, with about 10 pairs of costal nerves. *Nut* ½ in. diam., blackish, veined.

4. **V. leiocarpa,** *Benth. in Journ. Linn. Soc.* v. 77; flowers in small axillary clusters or cymes, the upper often forming leafless panicles, fruit glabrous 1½–2½ in., nut girt round the middle. V. madraspatana, *Benth. in Hook. Kew Journ.* iv. 42.

Birma, *Griffith;* Tenassrim, *Helfer;* Malacca, *Maingay.*—Distrib. Hongkong.

Leaves ovate to oblong acuminate, crenate-serrate or entire, coriaceous, shining, with about 6 pairs of costal nerves. *Fruit* ⅓–¼ in. diam.

? Var.; leaves larger ovate or elliptical obtuse, costal nerves about 10 pair.—Malacca, *Maingay;* Trop. Africa.—Without the fruit it is impossible to be certain that this is not a distinct species.

5. **V. bombaiensis,** *Dalz. in Hook. Kew Journ. Bot.* iii. 36; young branches and flowers covered with fulvous tomentum, flowers fascicled in the axils of the leaves. *Dalz. & Gibs. Bomb. Fl.* 48; *Bedd. Ic. Pl. Ind. Or.* t. 114.

The CONCAN; at Chorla Ghat, *Dalzel.*

Leaves 3–5 by ¾–1¾ in., lanceolate, acute or subacuminate, crenate, glabrous, with about 3–4 pairs of costal nerves. *Fruit* ?—Mr. Bentham, in Journ. Linn. Soc. v. 77, suggests that this may be only a side shoot of *V. calyculata*, but the shape of the leaves, the number of the costal nerves, and Dalzel's supposition that the fruit is larger than in *V. madraspatana*, point to its being distinct.

2. **SMYTHEA,** Seeman.

Scandent shrubs. *Flowers* fascicled or solitary in the axils of the leaves. *Calyx* 5-fid; lobes spreading; tube obconical. *Petals* 5, cucullate, broadly emarginate, 2-lobed. *Stamens* 5, not included in the folds of the petals, filaments incurved. *Disk* 5-angled, flat. *Ovary* 2-celled; styles 2, recurved. *Fruit* a 1-celled 1-seeded capsule, dehiscing down the middle, compressed, not winged. *Seed* flat, large, exalbuminous.—DISTRIB. Sp. 2, one Malayan, the other Fijian.

1. **S. calpicarpa,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 301.

TENASSERIM, *Helfer.*

Branches clothed with fulvous hairs. *Leaves* 3–4 by 1–1½ in., elliptic-lanceolate, sometimes shortly acuminate, crenate, slightly pilose on the nerves beneath otherwise glabrous. *Flowers* solitary in the axils of the leaves. *Fruit* (immature) 1¼ by ¾ in., oblong, coriaceous, covered with dense silky fulvous hairs.

3. **ZIZYPHUS,** Juss.

Trees or shrubs, often decumbent or sarmentose and frequently armed with sharp, straight or hooked prickles (transformed stipules). *Leaves* subbifarious, alternate, usually coriaceous. *Flowers* fascicled, or in sessile or pedunculated cymes. *Calyx* 5-fid, lobes spreading, keeled within; tube broadly obconical. *Petals* 5, rarely 0, cucullate, deflexed. *Disk* 5–10-lobed, flat or pitted, with a free margin. *Stamens* 5. *Ovary* sunk in the disk and confluent with it at the base, 2–4-celled; styles 2–4, free, or more or less united. *Fruit* fleshy or dry, with a woody or bony 1–4-seeded 1–4-celled stone. *Seed* plano-convex, albumen 0, or very scanty.—DISTRIB. Species about 50, found in tropical Asia and America, and the temperate regions of both hemispheres.

* *Flowers in sessile cymes or fascicled in the axils of the leaves.*

1. **Z. Jujuba,** *Lamk. Dict.* iii. 318; usually armed, leaves 1–2½ by ¾–2 in. elliptic-ovate ovate or suborbicular dark green and glabrous above, covered beneath with a dense woolly pale-coloured tomentum, fruit ½–¾ in. diam. *DC. Prodr.* ii. 21; *Roxb. Fl. Ind.* i. 608; *Wall. Cat.* 4244; *W. & A. Prodr.* 162; *Wight Ic.* t. 99; *Hook. Journ. Bot.* i. 320, t. cxl. (1834); *Dalz. & Gibs. Bomb. Fl.* 49; *Thwaites Enum.* 74; *Bedd. Fl. Sylvat.* t. cxlix.; *Boiss. Fl. Orient.* ii. 13; *Brandis For. Flor.* 86, t. 17. Z. mauritiana, *Herb. Ham. in Wall. Cat.* 4245; *DC. Prodr.* ii. 21. Z. Sororia, *Schult. Syst.* v. 337; *DC. Prodr.* ii. 21. Z. trinervius, *Roth Nov. Sp.* 168, excl. var. β. Rhamnus Jujuba, *Linn. Fl. Zeyl.* 36; *Rheede Hort. Mal.* iv. t. 40.

Throughout INDIA, from the N.W. frontier, SINDH, and base of the HIMALAYA to CEYLON, and MALACCA; wild and extensively cultivated.—DISTRIB. Affghanistan, tropical Africa, the Malay Archipelago, China, Australia.

A small tree 30–50 ft.; young branches and flowers covered with a dense fuscous tomentum. *Prickles* solitary and straight, or geminate and then one shorter and recurved. *Cymes* ¾ in. long. *Calyx* glabrous within. *Petals* subspathulate, very concave, reflexed. *Disk* of 10 grooved lobes. *Ovary* 2-celled; styles 2, united to the middle. *Fruit* globose, 2-celled, fleshy and mealy, glabrous.—There are many cultivated varieties, differing greatly in the shape and size of the leaves, as also in the size and nature of the fruit, of which the most remarkable is Edgeworth's var. *Hysudricus* (Journ. Linn. Soc. vi. 201), with erect or spreading not drooping branches, obtuse ovate oblong or orbicular leaves, glabrous or slightly tomentose beneath, and long petioles. This, according to Aitchison, is always raised by grafts. Two other varieties are described by Edgeworth—viz., *hortensis* and *spontaneus.*

2. **Z. glabrata,** *Heyne in Roth Nov. Sp.* 159; unarmed, leaves 1–3 by ⅔–1½ in. elliptic glabrous on both sides, fruit under ½ in. in diameter. *W. & A. Prodr.* 162; *Wight Ic.* t. 282; *Bedd. Fl. Sylv. Anal. Gen.* lxviii. Z. trinervius, var. β, *Roth. Nov. Sp.* 159. Z. trinervia, *Roxb. Fl. Ind.* i. 606, *not Poir.*; *Wall. Cat.* 4231.

EASTERN BENGAL and BHOTAN, *Griffith;* WESTERN PENINSULA, Nilghiri Mts., *Wight,* &c.

A tree. *Leaves* obtusely serrate, coriaceous, glossy, dark-green, with 3 unbranched prominent nerves. *Flowers* slightly puberulous, yellowish; cymes ½ in. long. *Petals* obtriangular with convolute margins. *Disk* faintly 10-lobed, not pitted or grooved, glabrous. *Ovary* 2-celled; styles 2, united to the middle. *Fruit* globose, yellow? with a sweet gelatinous pulp, 1–2-celled.—In some few cases the cymes are shortly pedunculate.

3. **Z. nummularia,** *W. & A. Prodr.* 162; profusely armed, leaves ½–1 in. ovate to orbicular covered with a short velvety tomentum on both sides, fruit ⅜ in. diam. *Dalz. & Gibs. Bomb. Fl.* 49; *Bedd. Fl. Sylv. Anal. Gen.* lxix.; *Boiss. Fl. Orient.* ii. 13; *Brandis For. Fl.* 88. Z. Lotus, *Lamk.; Aitch. Cat.* 33. Z. microphylla, *Roxb. Fl. Ind.* i. 613; *Wall. Cat.* 4232. Z. rotundifolia, *Lamk. Dict.* iii. 319; *DC. Prodr.* ii. 21. Rhamnus nummularia, *Burm. Fl. Ind.* 61.

The PANJAB, ascending to 3000 ft.; GOOZERAT, and the WESTERN PENINSULA, from the Deccan and Concan southwards.—DISTRIB. Persia.

A shrub, with widely-divaricating flexuous branches; young branches puberulous. *Leaves* serrate, dark-green and velvety above, pale and more felted beneath. *Cymes* under ½ in. *Petals* obovate with convolute margins. *Disk* 10-lobed with a pit opposite each lobe. *Ovary* 2-celled; styles 2, united to above the middle. *Fruit* globose, woody, black, 2-celled.—Much used for fencing, and the sweet subacid fruit as food, especially in famine time. I follow Wight and Arnott in adopting Burmann's specific name; though perhaps Lamarck's should be adopted.

4. **Z. wynadensis,** *Bedd. Ic. Pl. Ind. Or.* 23. t. cxiv.; unarmed, leaves 1½–2 by ¾ in. elliptic-lanceolate glabrous and shining above slightly hairy on the nerves beneath.

WESTERN PENINSULA; dense forests of the Wynaad, alt. 3000 ft., *Beddome.*

A lofty tree, the young shoots and flowers covered with a fulvous tomentum. *Leaves* finely reticulated beneath, penninerved, with hairy glands in the axils of the main nerves. *Flowers* fascicled, forming dense axillary clusters. *Petals* 3-lobed with convolute margins. *Disk* hairy, 5-angled, not pitted. *Ovary* 2-celled; styles 2, divided to nearly the base. *Fruit?*

5. **Z. vulgaris,** *Lamk. Dict.* iii. 316; armed, leaves ¾–2½ in. subobliquely ovate obtuse or subacute crenate-serrate glabrous on both sides, fruit ½ in. in diam. *Roxb. Fl. Ind.* i. 609; *Sibth. Fl. Græc.* i. 159, t. 241; *Boiss. Fl. Orient.* ii. 12. Z. flexuosa, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 365; *Cat.* 4229. Z. nitida, *Roxb. Fl. Ind.* i. 609. Z. sativa, *Gærtn. Fruct.* i. 202. ? Z. sinensis, *Lamk. Dict.* iii. 317.

PANJAB, extending to the Western frontier; the PANJAB HIMALAYA, *Falconer,* &c.; ascending to 6500 ft.; wild and cultivated, extending to Bengal.—DISTRIB. Beluchistan, W. Asia, China, Japan, S. Europe.

A shrub or small tree, with rigid spreading boughs and stiff branches, which are often unarmed, the whole plant quite glabrous. *Prickles* usually geminate, the straight one often over 1 in. long, stout. *Flowers* few, fascicled in the axils of the leaves. *Petals* cucullate. *Disk* thin, obscurely 5-lobed. *Ovary* 2-celled; styles 2, united to the middle. *Fruit* globose or oblong, succulent, red or black, shining.—*Z. nitida*, Roxb., of China, is said to have a yellow fruit.

6. **Z. oxyphylla,** *Edgew. in Trans. Linn. Soc.* xx. 43; armed, leaves 1–2 in. obliquely ovate acute or subacuminate glabrous on both sides, fruit elliptic ⅜ in. long. *Brandis For. Fl.* 85. Z. acuminata, *Royle Ill.* i. 168 (*name only*).

HAZARAH, *Falconer;* TEMPERATE HIMALAYA, in Sirmor and Garwhal, ascending to 6000 ft., *Falconer, Edgeworth,* &c.

A shrub or small tree, 25–30 ft., resembling *Z. vulgaris* in habit; whole plant quite glabrous. *Prickles* usually geminate, the straight one ½ in. long, slender. *Leaves* finely crenate-serrate. *Flowers* fascicled in the axils of the leaves. *Petals* and *disk* as in *Z. vulgaris*. *Fruit* 1-celled, 1-seeded, subfleshy, black, very acid; stone thin and crustaceous, flattened.

7. **Z. Œnoplia,** *Mill. Gard. Dict. No.* 3; armed, leaves 1–2½ by ¾–1 in. very obliquely ovate-lanceolate acute with a short soft pubescence above, and long silky appressed fulvous hairs beneath, fruit ¼ in. diam. *DC. Prodr.* ii. 21; *Roxb. Fl. Ind.* i. 611; *Wall. Cat.* 4246; *Don Prodr.* 190; *W. & A. Prodr.* 163; *Dalz. & Gibs. Bomb. Fl.* 49; *Thwaites Enum.* 74; *Bedd. Fl. Sylv. Anal. Gen.* lxix.; *Brandis For. Fl.* 86. Z. albens, *Roxb. Fl. Ind.* i. 607. Z. celtidifolia, *DC. Prodr.* ii. 20. Z. ferruginea, *Heyne in Wall. Cat.* 4246 B, *in part.* Z. Napeca, *Roxb. Fl. Ind.* i. 612, *not Willd.; Roth Nov. Sp.* 159. Z. pallens, *Wall. Cat.* 4247 ?. Z. pedicellata, *Wall. Cat.* 4243. Z. rufula, *Miq. Fl. Ind. Bat.* i. 643. Z. scandens, *Roxb. Hort. Beng.* 17; *Wall. Cat.* 7269. Rhamnus Œnoplia, *Linn. Sp. Pl.* 282.

Throughout the hotter parts of India, from the PANJAB and the N.W. HIMALAYA to Assam and southwards to CEYLON and MALACCA.—DISTRIB. Tropical Asia and Australia.

A shrub with straggling often climbing branches, the young ones strigose or oftener covered with a rust-coloured pubescence. *Leaves* crenate-serrate. *Prickles* solitary, very short, recurved. *Cymes* under ½ in. long. *Flowers* glabrous within. *Petals* obtriangular, cucullate. *Ovary* 2-celled; styles 2, united to above the middle. *Fruit* 1- rarely 2-celled, black and shining, globose or obovoid; stone woody or bony.

** *Flowers in pedunculate axillary cymes* (*see* 2. glabrata).

8. **Z. xylopyrus,** *Willd. Sp. Pl.* 1104; armed or on the younger branches often unarmed, branches inflorescence and fruit covered with a short greyish tomentum, leaves 1½–3½ in. broadly-elliptic orbicular or obovate glabrous and dark above covered with a soft pale pubescence beneath, fruit 1½–1 in. diam. *Roxb. Fl. Ind.* i. 611; *Wall. Cat.* 4239; *DC. Prodr.* ii. 21; *W. & A. Prodr.* 162; *Dalz. & Gibs. Bomb. Fl.* 49; *Thwaites Enum.* 74; *Bedd. Fl. Sylv. Anal. Gen.* lxviii.; *Brandis For. Fl.* 90. Z. Caracutta, *Roxb. Fl. Ind.* i. 612; *Wall. Cat.* 4238. Z. cuneata, *Wall. Cat.* 7268. Z. elliptica, *Roxb. Fl. Ind.* i. 610. Z. orbicularis, *Schult. Syst.* v. 338; *DC. Prodr.* ii. 21. Z. ruminata, *Ham. in Wall. Cat.* 4236. Z. rotundifolia, *Roth Nov. Sp.* 160. Rhamnus xylopyrus, *Retz Obs.* ii. 11.

NORTH-WEST INDIA, *Royle, Edgeworth.* NIPAL, *Wallich;* BANDA, RAJPOOTANA, OUDE, ascending to 2000 ft.; BEHAR, WESTERN PENINSULA, from the Concan southwards. CEYLON, in hot dry places.

A large straggling shrub or small tree, often gregarious, deciduous. *Leaves* slightly oblique, rounded or subcordate at the base, serrulate. *Prickles* usually geminate, one straight the other recurved, glabrous. *Cymes* compact, 1–$1\frac{1}{2}$ in. *Flowers* sometimes 4-merous. *Calyx* glabrous within. *Petals* subspathulate, very concave, reflexed. *Disk* thin, 5-angled. *Ovary* 3- rarely 2- or 4-celled; styles usually 3, divided to near the base. *Fruit* globose, 3- rarely 2- or 4-celled, very hard and woody and covered with a dense almost felted grey or whitish tomentum.

Var.; branches leaves and fruit nearly glabrous, fruit oblong or round.—Perhaps the *Z. Caracutta* of Roxburgh.

9. **Z. Napeca,** *Willd. Sp. Pl.* 1104; profusely armed, branches inflorescence and petioles covered with spreading rusty hispid hairs, leaves $1\frac{1}{4}$–$2\frac{1}{4}$ by $\frac{3}{4}$–$1\frac{1}{3}$ in. elliptic obtuse or very shortly cuspidate finely serrulate dark and glabrous on both surfaces, styles 2. Rhamnus Napeca, *Linn. Sp.* 194; *Fl. Zeylan.* 87.

Ceylon, *Herb. Linnæus.*

A straggling shrub. *Leaves* slightly oblique, rounded at the base, glabrous or when young slightly hispid on the nerves beneath. *Prickles* solitary or geminate, stout, hairy, dark, both recurved. *Styles* equalling the ovary, arms recurved. *Fruit?*—This, by inspection of the specimens preserved in Hermann's Herbarium, I have determined to be the true *Z. Napeca* of Linnæus. No modern collector has sent it from Ceylon, whence it may be suspected that the habitat is erroneous.

10. **Z. lucida,** *Moon Cat.* 17; armed, leaves 2–$2\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{1}{4}$ in. ovate-lanceolate glabrous above hairy on the veins beneath, styles $3\frac{1}{16}$ in. divided to the middle, fruit $\frac{1}{2}$ in. diam. *Thwaites Enum.* 74.

Ceylon, *Walker*, *Thwaites.*

A prickly shrub. *Branches* far climbing, round, glabrous or hairy when young, black. *Leaves* oblique, crenate-serrate with a minute bristle in each crenature, minutely apiculate. *Prickles* solitary, very short, recurved. *Flowers* in pedunculated cymes about 1 in. very hairy. *Petals* $\frac{1}{12}$ in., deeply cuculate on a slender claw. *Disk* faintly 5-angled, not pitted. *Fruit* globose, black, smooth.—Very closely allied to *Z. Napeca.*

11. **Z. Linnæi,** *Laws.;* armed, leaves $1\frac{1}{2}$–2 by $\frac{3}{4}$–$1\frac{1}{4}$ in. ovate glabrous and shining, styles 4 exceedingly minute. Z. Napeca, *Linn. Herb. not Herb. Hermann.*

Ceylon, *Walker.*

A prickly shrub. *Branches* round, glabrous, pale. *Leaves* nearly symmetrical, crenate without the bristles and not apiculate, pale green. *Prickles* solitary, very short, recurved. *Cymes* shortly-peduncled, about 1 in., nearly glabrous. *Flowers* larger than in *Z. lucida.* *Petals* deeply cuculate, but on rather less slender claws. *Disk* faintly 5-angled, not pitted. *Fruit?*—This is the *Z. Napeca* in the *Linn. Herb.*, but not of Hermann's herbarium.

12. **Z. incurva,** *Roxb. Fl. Ind.* i. 614; armed, leaves 2–$3\frac{1}{2}$ by 1–$1\frac{3}{4}$ in. ovate or ovate-oblong acute or subacuminate glabrous, petals 5, ovary 2-celled, styles 2, fruit $\frac{3}{8}$ in. long. *DC. Prodr.* ii. 20; *Don Prodr.* 189; *Wall. Cat.* 4237.

Nipal, *Wallich;* Bhotan, *Griffith;* Western Peninsula, Nilghiri Mts., *Herb. Hohenacker.*

A tree? *Leaves* crenate-serrate, membranous, turning black in drying. *Cymes* $\frac{3}{4}$ in. *Calyx* hairy outside, glabrous within. *Petals* subcucullate. *Disk* 10-lobed, with a pit opposite each lobe. *Styles* divided to the middle. *Fruit* ellipsoid, woody, 2-celled, 2-seeded.

13. **Z. apetala,** *Hook. f.;* armed, leaves $2\frac{1}{2}$–4 by 1–$1\frac{1}{2}$ in. obliquely-ovate acute or acuminate glabrous, petals 0.

Sikkim Himalaya, *J. D. H.*

A shrub; young branches and flowers covered with ferruginous pubescence. *Leaves* crenate-serrate, membranous. *Prickles* recurved, very short and sharp, base broad.

Cymes 1½ in. *Calyx* hairy inside. *Disk* 5-lobed, corrugated, hairy. *Ovary* 2-celled; styles 2, united to a little above the middle.

14. **Z. horrida,** *Roth Nov. Sp.* 159; profusely armed, leaves ¾–1¼ by ½–1 in. suborbicular glabrous, petals 5, ovary 3-celled, styles 3 minute, fruit ⅝ in. diam. *DC. Prodr.* ii. 20; *W. & A. Prodr.* 163 ?

WESTERN PENINSULA, *Wight;* the Concan, *Stocks.*

A shrub with slender divaricating branches. *Leaves* coarsely serrate, especially at the apex. *Prickles* geminate, very short, straight and recurved, the straight one ½ in. long or more. *Flowers* in dense cymes 1 in. long. *Calyx* hairy outside, glabrous inside. *Petals* spathulate, concave. *Disk* 5-angled, not pitted. *Styles* divided to nearly the base. *Fruit* globose, woody, 3-celled, 3-seeded.—Although this description does not entirely agree with that of Roth, I do not know to what other species his description can apply. Z. Bhunder, *Royle Ill.* i. 168 (name only), is scarcely determinable, but is apparently closely allied to this species.

*** *Flowers in pedunculated cymes, which are disposed in leafless (rarely leafly) simple or compound spikes.*

15. **Z. calophylla,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 366; armed, leaves 4–5 by 2–2¼ in. elliptic-oblong shortly and obtusely acuminate entire with 3 very prominent unbranched nerves glabrous, petals 5, fruit ¾ in. diam. *Wall. Cat.* 4230. Berchemia calophylla, *G. Don Gen. Syst.* ii. 28.

PENANG, *Wallich;* MALACCA, *Griffith, Maingay.*—DISTRIB. Borneo.

A shrub, with climbing branches and black bark; wholly glabrous with the exception of the flowers and fruit. *Leaves* coriaceous. *Prickles* solitary, recurved, short, stout, base broad. *Cymes* usually disposed in terminal thyrsoid panicles. *Calyx* hairy outside, glabrous within. *Petals* ovate, concave. *Disk* 5-angled, not pitted, glabrous. *Ovary* 2-celled, puberulous; styles 2. *Fruit* globose, woody, covered with a light-brown pubescence, at length glabrous.—Kurz (*in Journ. As. Soc. Beng.* 1870, ii. 73) identifies with this species Z. ornata, *Miq. Fl. Ind. Bat.* i. 642.

16. **Z. funiculosa,** *Ham. in Wall. Cat.* 4234; armed, leaves 2½–5 by ¾–2 in. ovate or ovate-oblong obtusely acuminate with 3 very prominent unbranched nerves, petals 5, fruit obovoid ⅜ in. long. ? Z. venulosa, *Wall. Cat.* 4235.

EASTERN BENGAL, the KHASIA MTS., and SILHET, *Wallich,* &c. ? BIRMA, *Griffith;* TENASSERIM, *Helfer;* MALACCA, *Maingay.*—DISTRIB. ? Borneo.

A shrub ?; young branches and flowers puberulous; branches long slender climbing. *Leaves* crenate. *Prickles* short, stout, recurved, quite glabrous. *Cymes* disposed in leafless rarely leafy panicles. *Petals* cucullate. *Disk* faintly 10-lobed, not pitted, glabrous. *Ovary* 2-celled; styles 2, divided to nearly the base. *Fruit* 1-celled, 1-seeded, fleshy, glabrous.—Z. venulosa, *Wall. Cat.* 4235, may be a more slender form of the above.

17. **Z. rugosa,** *Lamk. Dict.* iii. 319; armed, leaves 2½–6 in. elliptic glabrous above young tomentosely pubescent beneath, the older nearly glabrous, petals 0, fruit ¼–⅓ in. obovoid or globose. *DC. Prodr.* ii. 20; *W. & A. Prodr.* 162; *Wight Ic.* 339; *Dalz. & Gibs. Bomb. Fl.* 49; *Thwaites Enum.* 73; *Brandis For. Fl.* 89. ? Z. Burræa, *Ham. in Wall. Cat.* 4240 g. Z. glabra, *Roxb. Fl. Ind.* i. 614; *Wall. Cat.* 4242. Z. latifolia, *Roxb. Fl. Ind.* i. 607; *Wall. Cat.* 4240; *DC. Prodr.* ii. 20. Z. obliqua, *Heyne in Roth Nov. Sp.* 161; *DC. Prodr.* ii. 20. Z. paniculata, *Roth Nov. Sp.* 160; *Wall. Cat.* 4241. *DC. Prodr.* ii. 20. ? Z. tomentosa, *Roxb. Fl. Ind.* i. 611. ? Rhamnus glabratus, *Herb. Heyne in Wall. Cat.* 7479.

TROPICAL HIMALAYA, in Kumaon and Sikkim. BEHAR, *J. D. H.* ASSAM, and SILHET, *Wallich,* &c. BIRMA, *Griffith.* WESTERN PENINSULA, from the Concan southwards; CEYLON, common up to 2000 ft.

A straggling evergreen large shrub, or small tree, often climbing. *Prickles* usually solitary, recurved, short, base broad. *Flowers* densely pubescent, in long pedunculated cymes, forming on the usually leafless branches long terminal panicles. *Calyx* puberulous inside. *Disk* 5-lobed, hairy. *Ovary* 2-celled; styles 2, united below the middle. *Fruit* fleshy, with a 1-celled, 1-seeded, very thin crustaceous stone.—Dalzel and Gibson speak of the fruit as being very palatable, and affording great support to the inhabitants of the Ghauts from March to the middle of May. Brandis calls it mawkish and peculiar. Kurz *in Journ. As. Soc. Beng.* 1870, ii. 73, identifies Z. Horsfieldii, *Miq. Fl. Ind. Bat.* i. 643, with Z. glabra, *Roxb.*, but that species is closely allied to Z. Napeca, *L.*, if not a variety of it.

18. **Z. ? elegans,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 366; *Cat.* 4233; an erect nearly unarmed shrub, branches filiform pubescent, leaves 1½ by ½ in. obliquely-ovate-lanceolate obtusely acuminate finely crenate quite glabrous with 3 prominent unbranched nerves.

SINGAPORE, *Wallich*.

The flowers and fruit are not known.

UNDETERMINABLE AND EXCLUDED SPECIES.

Z. BAENCHIA, *Wall. Cat.* 4249, from Monghir, and Z. GLOBULARIS, 4248, from Birma are undeterminable.

Z. BHUNDER, *Royle Ill.* i. 168, name only is undetermined.

Z. LOTUS, *Lamk.; Roxb. Fl. Ind.* i. 610, is a bush allied to *Z. nummularia*, a native of S. Europe, N. Africa, and Arabia.

Z. NITIDA, *Roxb. Fl. Ind.* i. 609, is a native of China.

Z. SPINA-CHRISTI, *L.*, is a tree cultivated in gardens in N.W. India, allied to *Z. Jujuba*, it is a native of W. Asia and Egypt.

4. BERCHEMIA, Neck.

Shrubs with armed often scandent branches. *Leaves* alternate, penninerved; nerves straight, parallel. *Flowers* hermaphrodite or polygamous, fascicled, fascicles disposed in axillary spikes or panicles, or in the axils of the leaves, or clustered at the ends of the branches. *Calyx* 5- rarely 6-fid; tube hemispherical or turbinate. *Petals* 5, rarely 6, obovate or cucullate. *Disk* lining the calyx-tube, margins free. *Ovary* sunk in the disk, but free from it, 2-celled, narrowed into the bifid style. *Fruit* a hard or fleshy drupe, girt at the base with the calyx-tube; stone crustaceous or woody, 2-celled, 2-seeded. *Seed* linear-oblong, albumen fleshy.—DISTRIB. Species about 10, scattered through the tropics of Asia, Africa, and America.

1. **B. floribunda,** *Wall. Cat.* 4256; leaves 2–4 in. ovate acute, petiole ¾–1 in., panicles very large terminal. *Brandis For. Fl.* 91. B. laxa, *Wall. Cat.* 4257. Zizyphus floribunda, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 368.

TROPICAL HIMALAYA, from the Jhelum to Sikkim; EASTERN BENGAL and KHASIA MTS., *Griffith*, &c.

A large erect or climbing shrub or small tree. *Branches* glabrous, glaucous when young. *Stipules* 2-fid. *Flowers* sessile or very shortly pedicellate, about 6 in a fascicle. *Calyx* 5-fid; calyx-lobes lanceolate, acute. *Petals* 5, spathulate. *Fruit* ⅔ in. long, purple, cylindric.—Very closely allied to if not identical with *B. racemosa*, Sieb., of China and Japan (*Brandis*).

2. **B. flavescens,** *Wall. Cat.* 4255; leaves 2–3 in. ovate-oblong acute cuspidate, petiole ¾ to 1 in., flowers in short terminal racemes or panicles usually under 3 in. Zizyphus flavescens, *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 367.

TEMPERATE HIMALAYA; Nipal, *Wallich;* Sikkim, alt. 7–10,000 ft., *J. D. H.*

A climbing shrub; young branches with black spreading deciduous hairs. *Pedicels* $\frac{1}{8}$–$\frac{1}{6}$ in. long, often arcuate. *Calyx* 5-fid; lobes triangular, acute. *Petals* 5, oblong. *Stamens* 5. *Fruit* $\frac{1}{2}$ in. long.

3. **B. polyphylla,** *Wall. Cat.* 4259; leaves 1–1$\frac{1}{2}$ in. ovate obtuse, petiole $\frac{1}{4}$ in., flowers in axillary racemes.

BIRMA; at Taong Dong, *Wallich.*

An erect? shrub; young branches, rachis, and petioles puberulous. *Pedicels* $\frac{1}{8}$–$\frac{1}{3}$ in. long, straight. *Calyx* 5-fid, lobes triangular, acute. *Petals* 5, almost orbicular. *Stamens* 5. *Fruit* $\frac{1}{3}$ in. long.—Closely allied to *B. flavescens.*

4. **B. lineata,** *DC. Prodr.* ii. 23; leaves $\frac{1}{4}$–1 in. ovate or suborbicular subsessile, stipules very small setaceous, flowers 2–3 together fascicled in the axils of the leaves or clustered at the ends of the branches. *Hook. & Arn. Bot. Beech.* 177, t. xxxvii.; *Brandis For. Flor.* 91. ? B. Poiretiana, *DC. Prodr.* ii. 23. Rhamnus lineatus, *Linn. Amœn.* iv. 308.

NORTH WEST HIMALAYA, from the Indus eastwards; Khazan Valley, alt. 4–7000 ft., *Stewart;* Sikkim, alt. 10,000 ft., *J. D. H.*—DISTRIB. China.

A diffuse shrub, with subvoluble branches, puberulous when young. *Flowers* on slender pedicels $\frac{1}{4}$–$\frac{3}{8}$ in. *Calyx* 5-cleft; lobes linear-subulate, many times longer than the tube. *Petals* linear-lanceolate. *Fruit* ovoid, $\frac{1}{4}$ in. long, succulent, blue.

5. **B. Edgeworthii,** *Laws.;* leaves $\frac{3}{4}$–1 in. subelliptic, petiole $\frac{1}{8}$–$\frac{1}{4}$ in., stipules $\frac{1}{4}$ in. long ovate-lanceolate scarious, flowers about 2 together in the axils of the leaves.

WESTERN HIMALAYA, alt. 7–8000 ft., *Edgeworth.*

An erect? shrub, with glabrous branches. *Flowers* on short pedicels, the buds almost hidden by the stipules. *Calyx* 6-fid. *Petals* 6, very broadly-ovate. *Stamens* 6. *Fruit* $\frac{2}{3}$ in. long, surrounded at the base by the persistent entire calyx.—Known at once by its conspicuous stipules and 6-merous flowers.

5. **RHAMNUS,** L.

Shrubs or trees. *Leaves* alternate, penninerved. *Flowers* fascicled in the axils of the leaves or disposed in simple or compound racemes, hermaphrodite or polygamous. *Calyx* 4–5-fid; tube urceolate; lobes keeled within. *Petals* 4–5 or 0, cucullate or flat. *Stamens* 4–5. *Disk* thin, lining the calyx-tube. *Ovary* free, 3–4-celled, narrowed into a 3–4-cleft style. *Fruit* a berry-like drupe, girt at the base by the small calyx-tube, 2–4-celled, 2–4-seeded, obscurely dehiscent or indehiscent. *Seed* obovoid, albumen fleshy.—DISTRIB. Species about 60, scattered over the hotter and temperate regions of both hemispheres.

* *Flowers 4-merous.*

1. **R. Arnottianus,** *Gardn. in Thwaites Enum.* 74; unarmed, petals 0.

CEYLON; in the most elevated parts of the Central province.

A small glabrous tree; young branches puberulous. *Leaves* 1$\frac{1}{2}$–3 by $\frac{3}{4}$–1$\frac{1}{4}$ in., ovate-lanceolate, acute or subacuminate, closely serrate. *Flowers* 2–4, fascicled in the axils of the leaves. *Fruit* on pedicels $\frac{3}{4}$–1 in. long, the size of a pea, 3–4-lobed, reddish-black.—The whole plant turns blackish in drying.

2. **R. persicus,** *Boiss. Fl. Orient.* ii. 17; armed, leaves tomentose beneath, petals 4. *Brandis For. Flor.* 93.

SULIMAN and SALT ranges; TEMPERATE HIMALAYA, from the Jhelum eastwards to Garwhal, alt. 2–5000 ft.; WESTERN TIBET, alt. 9–14,000 ft.—DISTRIB. Beluchistan, Persia.

A shrub, 6–8 ft., or small tree, 20 ft., with coarse spinous or unarmed branches. *Leaves* fascicled at the ends of the congested branchlets, ½–2 in., oblong or elliptic-lanceolate or obovate, acute or rounded at the apex, minutely tomentose beneath, entire or faintly serrate. *Flowers* few, shortly pedicellate, fascicled in the axils of the leaves. *Petals* spathulate. *Ovary* 3–4-celled. *Fruit* ⅙ in. long, obovoid-globose, 2–4-celled, 1 or 2 of the cells often abortive.—Boissier mentions only the small obovate-leaved plants, but in many specimens the large and small leaves occur together.

3. **R. dahuricus,** *Pall. Fl. Ross.* ii. t. 61; armed, leaves glabrous, petals 4. *DC. Prodr.* ii. 25. R. globosus, *Bunge Enum. Chin.* 14. R. parvifolius, *Turcz. in Bull. Mosc.* 1857, ii. 150. R. polymorphus, *Turcz. Fl. Baik. Dahur.* i. 269. R. virgatus, *Roxb. Fl. Ind.* i. 604; *Don Prodr.* 190; *Brand. For. Flor.* 92; *var.* sylvestris, *Maxim. in Mem. Acad. Imp. Sc. Petersb.* x. 11, 13.

The PANJAB, at Peshawur, *Stewart;* TEMPERATE HIMALAYA, from Jamu and Simla, to Bhotan, alt. 4–9500 ft.; WESTERN PENINSULA, in the Ghats.—DISTRIB. China, Japan.

A tree, 15–20 ft., or shrub, usually much branched, very variable in habit and shape of the leaves. *Branches* divaricating, the spines terminating the branches and so often appearing in the forks. *Leaves* fascicled at the ends of the exceedingly congested branchlets, ¾–2 in., obovate, acuminate, to narrow elliptical-lanceolate, slightly pubescent beneath when young. *Flowers* numerous, fascicled in the axils of the leaves. *Petals* spathulate. *Fruit* obovate-obicular, ⅕ in. long.—Closely allied to the European *R. catharticus*. It seems hardly possible to define even as varieties the numerous forms that have been proposed as species. R. virgatus, var. aprica, *Max. in Mem. Acad. Sc. Petersb.*, is a dwarf form with scrubby squamose branches and very small leaves.

VAR. *hirsutus;* a large shrub or small tree, leaves 2 in. R. hirsutus, *W. & A. Prodr.* 165; *Bedd. Fl. Sylv. Anal. Gen.* lxx. t. x. f. vi.—Western Peninsula.

** *Unarmed. Flowers 5-merous.*

4. **R. Wightii,** *W. & A. Prodr.* 164; leaves 3–5 by 1–2 in. glabrous, flowers fascicled, petals 5. *Wight Ic.* t. 159; *Bedd. Fl. Sylv. Anal. Gen.* lxx.; *Dalz. & Gibs. Bomb. Fl.* 50. Ceanothus Wightiana, *Wall. Cat.* 4264.

WESTERN PENINSULA; from the highest hills of the Concan southwards to the Nilghiris. CEYLON; in the elevated parts of the Central province.

A large glabrous shrub, the younger parts drying black. *Leaves* elliptic or narrowly-elliptic, shortly acuminate, closely serrate, subcoriaceous. *Pedicels* much shorter than the petiole. *Petals* cuneate-obovate, with a short apiculus, flat. *Styles* 3–4, diverging.

5. **R. purpureus,** *Edgew. in Trans. Linn. Soc.* xx. 44; leaves 3–5 by 1–2 in. glabrous, flowers fascicled, petals 0. *Brandis For. Flor.* 91.

WESTERN HIMALAYA; from Marri to Kumaon, alt. 4500–10,000 ft.

A middle-sized unarmed tree. *Branches* purplish, with white spots; the young leaves pubescent beneath, otherwise glabrous. *Leaves* ovate, shortly acuminate, closely and finely serrate, membranous. *Flowers* 2–3; pedicels ¼ in., nearly as long as the petiole. *Fruit* on pedicels ½ in., the size of a pea, subglobose, bitter and purgative.

6. **R. triqueter,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 376 (*under* Ceanothus); *Cat.* 4265; leaves 3–6 by 1–2½ in. pubescent beneath, fascicles of flowers disposed in racemes.—*Brand. For. Fl.* 92.

PANJAB, in the Salt range; WESTERN HIMALAYA, from the Jhelum, alt. 3–4000 ft., *Stewart;* to Kumaon, alt. 6000 ft.

A shrub, the young branches pubescent. *Leaves* elliptic-ovate to oblong-lanceolate, acute or subacuminate, closely serrate, the old leaves pubescent on the nerves only. *Flowers* shortly pedicellate, fascicled on the leafless (very rarely leafy) branches, puberulous. *Petals* broadly obovate, emarginate. *Fruit* ⅛ in., obovoid, 3-lobed.—Although Wallich says of this species that the fruit is acutely 3-cornered, I do not find it to be the case in any of his specimens.

7. **R. nipalensis,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 375 (Ceanothus); *Cat.* 4263; leaves 3–6 by 1¼–2 in. glabrous fascicles of flowers disposed in simple or compound racemes, petals 5.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich;* Sikkim, alt. 3–6000 ft., *J. D. H.;* KHASIA MTS., alt. 3–4000 ft., and ASSAM; BIRMA? *Griffith.*

A suberect or rambling shrub, with long slender glabrous branches, or pubescent only on the younger parts. *Leaves* oblong or elliptic-oblong, shortly acuminate, serrate, membranous or subcoriaceous, dark-green and shining above. *Flowers* shortly pedicellate, small, green, pubescent. *Petals* oblong, concave. *Fruit* ¼ in., broadly obovate, blackish-red.

8. **R. procumbens,** *Edgew. in Trans. Linn. Soc.* xx. 43; leaves ½–1 in., petals 0. R. rupestris, *Royle Ill.* 169 (*name only*).

WESTERN HIMALAYA, from Simla to Kumaon, alt. 7–8000 ft., *Edgeworth,* &c.

A small shrub with prostrate branches, the younger ones pubescent. *Leaves* lanceolate, acute or subacuminate, coriaceous, serrulate, very shortly petiolate. *Flowers* 1–2, in the axils of the leaves, pedicellate. *Fruit* fleshy.

6. **HOVENIA,** Thunb.

A small unarmed tree. *Leaves* alternate, subbifarious. *Flowers* in pedunculated, dichotomous, many-flowered, axillary and terminal cymes. *Calyx* 5-fid; tube broadly obconical. *Petals* 5, inserted below the disk, clawed, cucullate. *Stamens* 5, a little longer than the petals. *Disk* lining the calyx-tube, the margin free and hairy. *Ovary* conical, sunk in disk, 3-celled; style 3-cleft, branches straight, erect. *Fruit* with arching thickened pedicels, the size of a pea, indehiscent, obscurely 3-lobed, 3-celled, 3-seeded, the outer covering coriaceous and separating from the inner membranous endocarp.

1. **H. dulcis,** *Thunb. Fl. Jap.* 101; *Lamk. Ill.* t. 131; *Sieb. Fl. Jap.* t. 73 & 74; *Bot. Mag.* t. 2360; *Roxb. Fl. Ind.* i. 630; *Wall. Cat.* 4274; *DC. Prodr.* ii. 40; *Brandis For. Flor.* 94; *Don Prodr.* 189. H. acerba, *Lindl. in Bot. Reg.* t. 501; *DC. Prodr.* ii. 40. H. inæqualis, *DC. Prodr.* ii. 40.

SUBTROPICAL HIMALAYA; alt. 3–6500 ft., from Chamba and Hazara to Bhotan, but often cultivated.—DISTRIB. China and Japan.

A tree 30 ft.; trunk straight; head broad, rounded. *Leaves* 4–6 by 2–3 in., ovate-acuminate, deeply and sharply serrate or nearly entire, membranous, glabrous or more rarely pubescent, 3-nerved at the base, the midrib pinnately branched.—Extensively cultivated in China and Japan for its sweet fleshy peduncles, which taste like a Bergamot pear.

7. **SCUTIA,** Comm.

Glabrous shrubs. *Leaves* opposite or subopposite, penninerved, coriaceous. *Flowers* in axillary fascicles or subumbellate. *Calyx* 5-fid; tube hemispherical or turbinate. *Petals* 5, clawed, emarginate, flat or hooded. *Disk* filling the calyx-tube. *Stamens* 5, equalling the petals. *Ovary* sunk in the disk, 2–4-celled, narrowed into a short 2–3-cleft style. *Fruit* broadly obovoid or subglobose, dry or sub-fleshy, surrounded at the base by the persistent calyx-tube, 2–4-celled, 2–4-seeded.—DISTRIB. Species 8; natives of Asia, Africa, and tropical America.

S. indica, *Brongn. in Ann. Sc. Nat.* x. 363; *W. & A. Prodr.* 165; *Wight Ill.* i. t. 73; *Dalz. & Gibs. Bomb. Fl.* 50; *Thwaites Enum.* 75; *Bedd. Fl. Sylv. Anal. Gen.* lxx. S. Commersoni, *Brongn. in Ann. Sc. Nat. Ser.* 1, x. 363. S. lucida, *G. Don Gen. Syst.* ii. 33. S. Rheediana, *Wight Ic.* t. 1071. Catha zeylanica, *G. Don Gen. Syst.* ii. 10. Ceanothus circumscissa, *Gærtn. Fruct.* ii. t. 106; *Wall. Cat.* 4266; *DC. Prodr.* ii. 30. C. zeylanica, *Heyne in Roth Nov. Sp.* 153; *Wall. Cat.* 4267; *DC. Prodr.* ii. 30. Celastrus zeylanica, *Roth in Rœm. & Schult. Syst.* v. 427; *Nov. Sp.* 398; *DC. Prodr.* ii. 9. Rhamnus circumscissus, *Linn. f. Suppl.* 152; *Roxb. Fl. Ind.* i. 603. R. lucidus, *Roxb. Fl. Ind.* i. 605. R. myrtinus, *Burm. Fl. Ind.* 60.—Rubiacea, *Wall. Cat.* 8300. Rhamnea ? lucida, *Wall. Cat.* 4250.

BIRMA, *Wallich;* WESTERN PENINSULA, from the Concan southwards; CEYLON, in the hot dry parts of the plains.—DISTRIB. Mauritius, *Roxb.*

Branches straggling, armed with subopposite recurved prickles, more rarely unarmed. *Leaves* ¾–1½ in. long, orbicular or obovate entire, or crenate.

8. **SAGERETIA,** Brongn.

Unarmed or spinous shrubs, with slender subscandent or rigid opposite or subopposite branches. *Leaves* subopposite, penninerved, nerves arched. *Flowers* very small, sessile on the terminal leafless paniculate branches. *Calyx* 5-fid, tube hemispherical; lobes acute, keeled within. *Petals* 5, clawed, hooded. *Stamens* 5, equalling the petals. *Disk* cup-shaped, lining the calyx-tube, margin free 5-lobed. *Ovary* sunk in the disk, but free from it, 3-celled; style short, 3-grooved, stigmas 3 capitate. *Fruit* globose, 3-celled, 3-seeded, coriaceous, indehiscent.—DISTRIB. Species about 11; natives of Central and Eastern Asia, Java, and the hotter parts of North America.

1. **S. hamosa,** *Brongn. in Ann. Sc. Nat. ser.* 1, x. 360; leaves 4–5 by 2 in. elliptic-oblong shortly acuminate serrate glabrous on both surfaces. Berchemia ? hamosa, *Wall. Cat.* 4253. Zizyphus hamosa, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 369.

NIPAL, *Wallich;* WESTERN PENINSULA; Pulney Mts., *Wight.*—DISTRIB. Formosa.

A large shrub, with long straggling glabrous branches, unarmed or with very stout short deflexed spines. *Flowers* puberulous, in terminal and axillary panicles not longer than the leaves. *Fruit ?*

2. **S. oppositifolia,** *Brongn. in Ann. Nat. Sc. ser.* 1, x. 360; leaves 2–4 in. ovate-lanceolate acute or subacuminate glabrous and dark green above covered beneath when young with a dense woolly tomentum, *Brand. For. Fl.* 95. Sageretia filiformis, *G. Don Gen. Syst.* ii. 29. Berchemia ? oppositifolia, *Wall. Cat.* 4254. B. ? parviflora, *Wall. Cat.* 4258. Rhamnus filiformis, *Roth Nov. Sp.* 153. R. parviflorus, *Klein in Rœm. & Schult. Syst.* v. 295; *DC. Prodr.* ii. 28. R. rigynus, *Don Prodr.* 190. Zizyphus oppositifolia, *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 370.

N.W. INDIA and SUBTROPICAL HIMALAYA; from Peshawur and Rajaori eastward to Nipal, alt. 2–5000 ft.; WESTERN PENINSULA, from the Concan southwards.—DISTRIB. Java.

A shrub or small tree, with long slender subsarmentose spinous branches, tomentose when young. *Leaves* with 5–8 pairs of nerves; petiole ½ in. *Flowers* in large terminal panicles. *Fruit* turbinate, ¼ in. long, black, succulent, sweetish.

3. **S. theezans,** *Brongn. in Ann. Sc. Nat. ser.* 1, x. 360; leaves 1½–2 in. ovate or elliptic minutely serrate dark green and glabrous above pubescent when young beneath. *Brandis For. Flor.* 95. Sageretia, *Wall. Cat.* 9010. Rhamnus theezans, *Linn. Mant.* 207.

The Salt and Suliman Ranges, alt. 2–8000 ft., *Fleming; Hazara, Stewart;* Western Himalaya, alt. 3–8000 ft., from Kashmir to Simla.—Distrib. Beluchistan, China.

A sarmentose spinous shrub with long slender branches. *Flowers* in long slender interrupted spikes. *Spines* and *flower branches* squarrose, or at the ends of the pendant branches. *Fruit* the size of a pea, globose, succulent, irregularly rugose, dark brown.—The fruit is sweet to the taste and extensively eaten, the leaves are used as a substitute for tea.

Var. *diospiryfolia;* a scrubby shrub not sarmentose, leaves shorter and broader, flower-spikes shorter. S. theezans, *Brand. For. Fl.* 95. Rhamnea? diospyrifolia, *Wall. Cat.* 4251.—Ava, *Wallich.*

4. **S. Brandrethiana,** *Aitch. in Journ. Linn. Soc.* viii. 62; leaves ¾–1 in. elliptic crenate or nearly entire glabrous above covered with a dense white woolly tomentum beneath 4–8-nerved very shortly petioled. *Boiss. Fl. Orient.* ii. 22; *Brand. For. Fl.* i. 95.

North Western India; the Salt Range, Jhelum and Peshawur, *Fleming,* &c.—Distrib. Westward to Persia and Arabia.

A scrubby shrub, with numerous spinose pubescent branches. *Flowers* in terminal and axillary panicles. *Fruit* the size of a small pea, ovoid, 3-lobed, succulent, black, with raised longitudinal lines.—The fruit is sweet and much eaten by the Affghans. *Brandis.*

S. corymbosa, *G. Don Gen. Syst.* ii. 29, is a West Indian species incorrectly stated by Don to be East Indian.

9. COLUBRINA, Rich.

Erect shrubs. *Leaves* alternate. *Flowers* in very short axillary cymes. *Calyx* 5-fid; tube hemispherical. *Petals* 5, clawed, springing from the margin of the disk, hooded. *Stamens* 5. *Disk* fleshy, filling the calyx-tube. *Ovary* sunk in the disk and confluent with it, 3-celled; style 3-cleft; stigmas reflexed. *Fruit* the size of a pea, subglobose, surrounded below the middle by the remains of the calyx-tube, 3-celled, cells 1-seeded, tardily dehiscent.—Distrib. Species 10, chiefly tropical American.

1. **C. asiatica,** *Brongn. in Ann. Sc. Nat. ser.* 1, x. 369; whole plant quite glabrous, leaves 1½–2 in. by ¾–1¼ in. acuminate. *W. & A. Prodr.* 166; *Wight Ill.* i. t. 74; *Dalz. & Gibs. Bomb. Fl.* 50; *Thwaites Enum.* 75; *Bedd. Fl. Sylv. Anal. Gen.* lxix. C. javanica, *Miq. Fl. Ind. Bat.* pt. 1, 649. Ceanothus asiaticus, *Lamk. Ill.* t. 129, f. 2; *DC. Prodr.* ii. 30; *Roxb. Fl. Ind.* i. 615; *Wall. Cat.* 4262. C. capsularis, *Forst. Prodr.* 18; *DC. Prodr.* ii. 32. Pomaderris capsularis, *G. Don Gen. Syst.* ii. 39; *Burm. Zeylan.* t. 48. Rhamnus acuminata, *Colebr. in Roxb. Fl. Ind.* i. 615.

Eastern and Western Peninsulas; from the Concan and Tenasserim southwards. Ceylon, north end of the Island.—Distrib. Java, Borneo, Australia, S.W. Africa.

Unarmed. *Leaves* 2 by 1 in., ovate, subacuminate, crenate-serrate, glabrous, membranous, 3-nerved at the base, the midrib pinnately branched. *Cymes* ¼–½ in. long. *Flowers* yellowish-green.

2. **C. pubescens,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 301; branches and flowers hispidly-pubescent, leaves 1½–2½ by ¾–1 in.

Pegu, *Kurz.*

Leaves ovate-oblong, acute or acuminate, hispidly-pubescent on both sides. *Petals* nearly sessile, broadly oval, emarginate, very concave. *Fruit?*

3. **C. travancorica,** *Bedd. Ic. Pl. Ind. Or.* t. 188; young branches covered with a dark rust-coloured pubescence, leaves 3–5 by 1$\frac{1}{4}$–1$\frac{3}{4}$ in.

Western Peninsula; Quilon, *Wight;* S. Travancor, *Beddome.*
Leaves oblong shortly and suddenly acuminate, glabrous above, slightly pubescent on the nerves beneath. *Flowers* $\frac{1}{3}$ in. across. *Pedicels* puberulous. *Calyx-tube* with a few hispid hairs, otherwise glabrous. *Petals* clawed, spathulate, acute.

10. **APTERON,** Kurz.

A scandent shrub. *Leaves* penninerved. *Flowers* small, fascicled, disposed in panicled racemes. *Calyx* 5-fid, tube shortly obconic; lobes spreading, acute. *Petals* 5, obovate, minute, inserted between the calyx-lobes. *Stamens* 5, a little longer than the petals, filaments filiform. *Disk* flat, free. *Ovary* subglobose, immersed in the disk, 2-celled; style very short, stigmas 2. *Drupe ?* globose, adnate to the calyx-tube as in *Gouania*, and crowned by the calyx-limb, 1-celled by arrest, 1-seeded?

1. **A. lanceolatum,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 301.

Tenasserim, *Kurz.*
A large scandent shortly-tomentose shrub. *Leaves* 4–5 in., lanceolate, with a long somewhat obtuse point, serrate, chartaceous with a fulvous pubescence on the nerves, at length glabrous, lateral nerves numerous (7–9) prominent and reaching to the margin. *Panicles* hoary or yellowishly tomentose. *Flowers* small; pedicels $\frac{1}{12}$ in., slender or subfleshy, puberulous, fascicled or sub-solitary. *Calyx* $\frac{1}{8}$–$\frac{1}{6}$ in. diam., puberulous. *Ovary* pubescent; style shortly bifid. *Fruit ?*—Kurz speaks of the *immature fruit* as being globose, and the size of a peppercorn. I have seen no specimen.

11. **GOUANIA,** Linn.

Unarmed climbing shrubs. *Leaves* alternate. *Flowers* polygamous, in axillary or terminal spikes; rachis often cirrhose. *Calyx* superior, 5-fid; tube short, obconic. *Petals* 5, inserted below the margin of the disk, hooded. *Stamens* 5, enfolded by the petals. *Disk* filling the calyx-tube, 5-angled or stellate. *Ovary* sunk in the disk, 3-celled; style 3-cleft. *Fruit* inferior, coriaceous, crowned by the persistent limb of the calyx, 3-winged.—Distrib. Species 30, chiefly American, a few are African and Asiatic, and one belongs to the Pacific Islands.

1. **G. microcarpa,** *DC. Prodr.* ii. 40; flowers sessile densely pubescent, disk glabrous 5-lobed, style-arms glabrous minute. *W. & A. Prodr.* 167; *Wall. Cat.* 4271; *Thwaites Enum.* 75. G. integrifolia, *Kurz in Journ. As. Soc. Beng.* 1871, pt. ii. 49. G. tiliæfolia, *Heyne in Wall. Cat.* 4271.

Western Peninsula; from the Concan southwards. Pegu, *Kurz.* Malacca, *Griffith,* &c. Ceylon, ascending to 2000 ft.—Distrib. Java.
Young branches and racemes pubescent. *Leaves* 2–3 by $\frac{3}{4}$–1$\frac{1}{2}$ in., ovate or elliptic, acute or acuminate, orbicular or subcordate at the base, entire or very faintly crenate-serrate, glabrous. *Calyx* densely hairy outside, glabrous within. *Petals* obovate-oblong, very concave, margins involute. *Disk-lobes* faintly emarginate, or truncate. *Fruit* shortly winged, pubescent, at length glabrous.

2. **G. leptostachya,** *DC. Prodr.* ii. 40; flowers shortly pedicelled glabrous, disk glabrous 5-lobed, lobes oblong faintly emarginate, style-arms elongate. *Roxb. Cor. Pl.* i. t. 95 (*not Lamk.*); *Wall. Cat.* 4270; *W. & A. Prodr.* 166; *Dalz. & Gibs. Bomb. Fl.* 50.

TROPICAL HIMALAYA, from Kumaon to Assam and the Khasia Mts., ascending to 4000 ft.; BANDA, BIRMA, TENASSERIM, and the MALAY PENINSULA.—DISTRIB. Java, Philippines.

Branches glabrous. *Leaves* 3–4 by 1¾–2 in., ovate, acuminate, subcordate at the base, serrulate. *Racemes* slightly puberulous; bracteoles conspicuous, subulate. *Calyx* glabrous or with a very few scatttered hairs on the outside. *Petals* hooded. *Styles* ¼ the length of the calyx-segments. *Fruit* glabrous.

3. **G. napalensis,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 417; *Cat.* 4272; flowers pubescent, disk glabrous the lobes linear acuminate, style-arms much elongated.

NIPAL, *Wallich.* SIKKIM, *Griff.*

Leaves longer and the *flowers* a little larger than in the last species, and the styles twice as long.

12. **HELINUS,** E. Meyer.

Unarmed scandent cirrhose shrubs, with slender angular branches. *Leaves* alternate, entire. *Flowers* umbellate, on long slender peduncles. *Calyx* superior, tube broadly obconic. *Petals* 5, inserted upon the margin of the disk, hooded. *Stamens* 5, equalling the petals. *Disk* epigynous, filling the calyx-tube. Ovary 3-celled; style short, 3-cleft, stigmas recurved. *Fruit* inferior, obovoid-globose, 3-celled; cells 1-seeded, coriaceous, tardily dehiscing.—DISTRIB. Species 3, two African, and one North Indian.

1. **H. lanceolatus,** *Brand. For. Fl.* 574. Gouania lanceolata, *Wall. Cat.* 4273.

The PANJAB, OUDE, and the WESTERN HIMALAYA from Kashmir to Kumaon, alt. 1–4000 ft.

The whole plant quite glabrous, or the youngest parts of the shoots and flowers pubescent. *Leaves* 1–1¾ by ½–¾ in., ovate to ovate-lanceolate.

ORDER XLIII. **AMPELIDEÆ.** (By M. A. Lawson, F.L.S.)

Small trees or shrubs, usually climbing by means of tendrils, more rarely radicant (sometimes herbaceous in *Leea*); juice copious, watery. *Stems* angled compressed or cylindric, with numerous very large proper vessels. *Leaves* alternate, usually petioled, simple or digitately or pedately 3–9-foliolate, rarely pinnate or decompound. *Flowers* umbellately- paniculately- or spicately-cymose. *Peduncles* often transformed into simple or compound tendrils or adhering to rocks or trees by viscid pads terminating the ultimate segments, or expanded into a broad floriferous membrane (*Pterisanthes*). *Flowers* regular, hermaphrodite, rarely unisexual. *Calyx* small, entire or 4–5-toothed or- lobed. *Petals* 4–5, distinct, or cohering, valvate, caducous. *Stamens* 4–5, opposite the petals, inserted at the base of the disk or between its lobes, filaments short subulate; anthers free or connate, 2-celled, introrse. *Disk* free or connate with the petals stamens or ovary, annular or variously expanded. *Ovary* 2–6-celled; style short, slender conical or 0, stigma minute or large and flat, sublobed; ovules 1–2 in each cell, ascending, anatropal, raphe ventral. *Berry* 1–6-celled; cells 1–2-seeded. *Seed* erect, often rugulose, albumen cartilaginous; embryo short basal, cotyledons ovate.—DISTRIB. Species about 250, inhabiting the tropical and temperate regions of the whole world.

Scandent shrubs, usually bearing tendrils. Flowers racemose or cymose. Ovary 2-celled, cells 2-ovuled . . . . 1. Vitis.
Flowers sessile on the dilated membranous peduncle . . . . 2. Pterisanthes.
Erect shrubs destitute of tendrils. Petals and stamens connate with the disk. Ovary 3–6-celled, cells 1-ovuled . . . . . . 3. Leea.

1. **VITIS,** Linn.

Sarmentose shrubs, climbing, usually by means of leaf-opposed tendrils, rarely rooting. *Leaves* simple or 3–9-foliolate and then digitate or pedate, rarely pinnate or bipinnate. *Flowers* umbellately- paniculately- racemosely- or spicately-cymose, usually ebracteate, sometimes polygamous. *Calyx* short, entire, or 4–5-toothed or -lobed. *Petals* 4–5, free or cohering at the apex. *Stamens* 4–5, inserted below the margins of the disk; anthers free. *Ovary* 2- very rarely 3–4-celled; style 0 or short; ovules 2 in each cell. *Berry* ovoid or globose, 1–2-celled; cells 1–2-seeded.—Distrib. About 230 species growing mostly in the tropics and subtropics of Asia, Africa and Polynesia, more rarely in America.

Sect. I. *Leaves* simple.

* Petals and Stamens 4.

† *Flowers umbellately-cymose.*

§ *Stems and branches acutely angled or winged.* (*See* 7, diffusa.)

1. **V. quadrangularis,** *Wall. Cat.* 5992; stems 4-winged very thick fleshy greatly contracted at the nodes. *W. & A. Prodr.* 125; *Wight Ic.* t. 51; *Brand. For. Fl.* 100. Cissus edulis, *Dalz. in Hook. Lond. Journ. Bot.* ix. 248; *Dalz. & Gibs. Bomb. Fl.* 40; *Thwaites Enum.* 62. C. quadrangularis, *Linn. Mant.* 39; *Roxb. Fl. Ind.* i. 407; *DC. Prodr.* i. 628; *Grah. Cat. Bomb. Pl.* 33; *Dalz. & Gibs. Bomb. Fl.* 39. Sælanthus quadragonous, *Forsk. Descr.* 33, t. 2.—*Rheede Hort. Mal.* vii. t. 41.

Throughout the hotter parts of India, from the foot of the Western Himalayas in Kumaon to Ceylon and Malacca.—Distrib. Java, East Africa.

Stems glabrous, often of a great length, sometimes nearly leafless. *Leaves* 1–1½ in., broadly cordate or reniform or 3–5-lobed, crenate-serrate, glabrous. *Cymes* small, shortly peduncled, glabrous. *Style* conspicuous, slender, stigma small. *Berry* globose, red, succulent, the size of a pea, very acrid.—The stems are frequently eaten by the natives of Ceylon in their curry.

2. **V. glyptocarpa,** *Thwaites Enum.* 62 (Cissus); branches slender 4-winged, leaves 2–3 by 1–1¾ in. truncate-cordate acuminate glabrous above, nerves beneath with a few appressed hairs.

Ceylon; hot drier parts of the Island, *Thwaites.*

Leaves serrate; petiole ¾–1¼ in. *Cymes* 3–5-rayed, longer than the petioles, glabrous. *Flowers* small, rufescent. *Petals* acute, reflexed. *Style* conspicuous. *Fruit* ¼ in., oblong, 1-seeded, blackish-purple.

3. **V. sagittifolia,** *Laws.*; very glaucous, stems 4-angled or -winged flaccid not contracted at the joints, leaves cordate-sagittate peltate. V. glaberrima, *Wall. Cat.* 5991 *in part; W. & A. Prodr.* 125. Cissus hastata, *Miq. Fl. Ind. Bat. Suppl.* 517.

Eastern Peninsula; Sincapore, *Wallich;* Penang, *Porter;* Malacca, *Griffith.*—Distrib. Java.

A weak trailing plant. *Leaves* 3–5 by 1½–2½ in., entire or distantly and often bristly-serrate; petiole 1½–2 in. *Petals* about $\frac{1}{12}$ in. *Style* conspicuous, slender. *Berry* small, obovoid, 2-seeded.

4. **V. lonchiphylla,** *Thwaites Enum.* 62 (Cissus); stems thick weak acutely-angled glabrous, leaves 4–7 by 1½–2½ in. oblong-lanceolate acuminate roundly truncate at the base, petiole ¼–½ in.

CEYLON; Ambagamowa district, at no great elevation, *Thwaites.*
Leaves remotely denticulate, 3-nerved at the base, subpeltate. *Cymes* longer than the short petiole. *Flowers* small. *Fruit* depressed, globose.

5. **V. pentagona,** *Roxb. Fl. Ind.* i. 408 (Cissus); stem 5-angled woody not contracted at the nodes. *DC. Prodr.* i. 628 (Cissus); *Kurz in Journ. As. Soc. Beng.* 1870, ii. 74.

Forests of CHITTAGONG, *Roxburgh;* ARRACAN and SOUTH ANDAMAN ISLDS. *Kurz.*
Stems more robust and wiry than in the last species. *Leaves* 3–4 by 1½–2¼ in., ovate or cordate-ovate, acuminate, serrulate, glabrous. *Cymes* on long peduncles. *Flowers* yellowish. *Petals* about $\frac{1}{12}$ in. *Style* shorter and stouter than in the last species, stigma capitate. *Fruit?*

§§ *Stems cylindric terete or obscurely angled.* (*Except* 7, diffusa.)

a. Plants glabrous.

6. **V. glaberrima,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 476; *Cat.* 5991 *in part;* glabrous, not glaucous, stem fleshy obtusely angled jointed not contracted at the nodes, leaves coriaceous obtuse or subcordate at the base, tendrils 0, flowers ⅕ in. conical.

EASTERN PENINSULA; Penang and Sincapore, *Wallich.*
Leaves 2½–5 by 1–2½ in., oblong, rounded at the apex or very shortly cuspidate, entire or remotely and very faintly bristly-crenate, drying green. *Cymes* about 1 in. long, compact. *Fruit* (unripe) 2-celled.—The absence of tendrils and large flowers serve to distinguish this species from its allies.

7. **V. diffusa,** *Miq. Ann. Mus. Bot. Lugd. Bat.* i. 83; glabrous, stem 4–5-angled or subterete suffrutescent, leaves subfleshy concave-truncate at the base, tendrils simple, flowers ⅙ in. oblong.

EASTERN PENINSULA; Sincapore, *G. Thomson;* Malacca, *Maingay.*—DISTRIB. Java?
Leaves 3–5 by 2–3 in., ovate, drying an ashy-brown, entire or distantly and faintly serrate. *Tendrils* long, woody, opposite the leaves. *Cymes* less compact than in *V. glaberrima.* *Fruit* fleshy, 1-celled, 1-seeded, black.—The description of the flowers is taken from Miquel's *V. nodosa* var. *subovata,* for any difference between it and this species I am not able to distinguish.

8. **V. furcata,** *Laws.;* glabrous, branches cylindric woody not jointed, leaves 3–4 by 2–2½ in. broadly ovate cuspidate distantly and faintly serrate coriaceous, tendrils forked towards the tips, petals ½ in., fruit nearly ½ in.

EASTERN PENINSULA; Sincapore, *G. Thomson;* Malacca, *Maingay.*
A woody climber. *Tendrils* long, woody. *Flowers* much smaller than in *V. diffusa.* *Style* conspicuous. *Fruit* obovate, black, dry, 1-celled, 1-seeded. *Seed* $\frac{4}{10}$ by $\frac{3}{10}$ in., obovate, angled, brown.

9. **V. repens,** *W. & A. Prodr.* 125; quite glabrous and glaucous, branches cylindric weak fleshy, leaves 3–8 by 1–3½ in. cordate-ovate acute with distant sharp spinous teeth pale green membranous, tendrils forked, petals $\frac{1}{12}$–⅛ in., fruit the size of a pea, pedicels slender. *Dalz. & Gibs. Bomb. Fl.* 39. V. glauca, *Wall. Cat.* 5990 *except* G. C. cordata, *Roxb. Fl.*

Ind. 1. 407; *Grah. Cat. Bomb. Pl.* 32. C. repens, *Lamk.*; *DC. Prodr.* i. 628.—*Rheede Hort. Mal.* vii. t. 48.

EASTERN TROPICAL HIMALAYA, the KHASIA MTS., ASSAM, and SILHET, ascending to 5000 ft. CHITTAGONG. TENASSERIM. WESTERN PENINSULA.—DISTRIB. Java, Amboyna. (*Roxb.*)

A weak trailing plant, always very glaucous, at least when young. *Tendrils* weak, fleshy. *Umbels* on slender peduncles, 1–4 in., the rays again umbelliferous. *Style* very conspicuous. *Fruit* dry, pedicels ½–1 in., neither fleshy nor increasing in size. *Seed* ⅙ in., globosely-pyriform, smooth, pale.

10. **V. discolor,** *Dalz. in Hook. Kew Journ. Bot.* ii. 39; glabrous, not glaucous, stems subangular weak, leaves 3–12 by 1–4 in. narrowly cordate-ovate acute the upper lanceolate subcordate or entire at the base bristly-serrate blotched with white on the upper surface membranous, tendrils forked, flowers and fruit as in *V. repens. Dalz. & Gibs. Bomb. Fl.* 40. V. inæqualis, *Wall. Cat.* 6010; *W. & A. Prodr.* 125. ? V. diversifolia, *Wall. Cat.* 5996. ? V. costata, *Wall. Cat.* 6011. C. discolor, *Blume Bijd.* 181; *Bot. Mag.* 80, t. 4763.

TROPICAL SIKKIM HIMALAYA, the KHASIA MTS., and SILHET, ascending to 3000 ft.; CHITTAGONG, PEGU, and TENASSERIM. WESTERN PENINSULA, in the Concan, *Dalzell.*—DISTRIB. Java.

Branches and pedicels bright red. *Leaves* oblique, spotted with transverse blotches of white between the nerves on the upper surface, purple beneath. *Fruit* reddish purple. *Seed* as in *V. repens.*—The presence and position of the blotches seem to be very uncertain. Instead of the discolorations lying between, they sometimes follow the course of the nerves, while sometimes the leaves are entirely destitute of any markings, in which case the plant becomes *Cissus velutinus*, Linden Cat. (in Bot. Mag. 86, t. 5207). *Vitis inæqualis*, Wall., appears to belong to the uncoloured forms of this species, in which the leaves are narrowly ovate-lanceolate, almost entire and very unequal at the base. To specimens taken from the tops of branches of either this species or *V. repens* must probably be referred *V. costata*, Wall. and *V. diversifolia*, Wall.

11. **V. Heyneana,** *Wall. Cat.* 5988 A; *W. & A. Prodr.* 125, *not DC.*; quite glabrous, branches thick hollow succulent, leaves 3–7 by 1½–4 in. cordate-ovate or ovate distantly and faintly serrate thick and leathery, tendrils simple, peduncle 1 in. usually 2-rayed, rays bearing numerous umbellate flowers, pedicels thick, petals ⅛ in., fruit ⅓ in. Cissus rotundiatia, *Heyne in Wall. Cat.* 5988; ? *DC. Prodr.* i. 628.

WESTERN PENINSULA in the Southern provinces, Courtallam and Travancor, *Wight.* CEYLON, *Thwaites.*

A coarse plant with thick fleshy leathery stems. *Leaves* pale green. *Tendrils* stout. *Petals* distinct. *Style* conspicuous. *Fruit* pyriform, dry, 1–2-seeded, the pedicels thickened upwards.—*Cissus glauca*, Thwaites (Enum. 62), has thick fleshy stems and leaves as in this species, leaves 6–8 by 4 in. ovate obtuse; the fruit resembles that of *V. pallida*, to which perhaps it is most closely allied.

12. **V. pallida,** *W. & A. Prodr.* 125; quite glabrous or young parts slightly puberulous, branches thick fleshy hollow, leaves 4–10 in. broadly cordate dentate-serrate or inciso-serrate often repand, tendrils simple, peduncle 1–2 in. very thick fleshy, cyme compact fleshy subcorymbose, bracts and bracteoles large glabrous and pellucid, petals $\frac{1}{12}$ in., fruit the size of a pea. *Oliv. Fl. Trop. Afr.* i. 393. ? V. Wallichii, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 302.

WESTERN HIMALAYA, Garwhal, *Strach. & Wint.* WESTERN PENINSULA, from the Concan southwards. AVA? *Kurz.*—DISTRIB. Abyssinia.

Young branches and leaves often pellucid. *Leaves* pale green; petiole 2–5 in. *Tendril* short, fleshy, opposite the leaves or 0. *Petals* distinct. *Style* long, slender. *Fruit* subglobose, 1- or according to W. & A. 1–2-seeded; pedicels very thick and fleshy. *Seed* $\frac{2}{5}$ in., pyriform, smooth, pale.—Wight and Arnott refer *Cissus vitiginea*, Roxb. Fl. Ind. i. 406, to this species, but Roxburgh's figure is without doubt *V. lanata*.

13. **V. glauca,** *W. & A. Prodr.* 126; whole plant except the younger parts quite glabrous, stems glaucous, leaves 5–10 by 2–4$\frac{1}{2}$ in. with long petioles roundly cordate rarely obscurely lobed cuspidate bristly-serrate membranous, tendrils forked, peduncles 2–3 in. very slender 3–5-rayed, rays umbellately many-flowered, bracts and bracteoles very small deciduous, petals $\frac{1}{16}$ in., fruit the size of a pea. V. Kleinii, *Wall. Cat.* 6008 A, B. Cissus cordata, *Roxb. Fl. Ind.* i. 407; *DC. Prodr.* i. 628. C. glauca, *Roxb. Fl. Ind.* i. 406; *Grah. Cat. Bomb. Pl.* 32. C. purpureus, *Roxb. ex Stend. ed.* ii. vol. i. 373.—*Rheede Hort. Mal.* vii. 21, t. 11.

WESTERN PENINSULA; from the Concan southwards.

Stems succulent, dark brown, cylindric, faintly striate. *Leaves* slightly puberulous when young, drying black. *Cymes* slender. *Flowers* very small; pedicels $\frac{1}{3}$ in., very slender. *Petals* distinct. *Style* long, slender. *Fruit* subglobose, 1–2-seeded. *Seed?*

VAR. *Stems* woody swollen at the nodes. *Leaves* distantly and very obtusely crenate not bristly-serrate.—Courtallam.

14. **V. assamica,** *Laws.*; whole plant except the youngest parts quite glabrous, branches subangular woody, leaves roundly cordate or orbicular cuspidate or suddenly and shortly acuminate bristly-serrate with recurved margins very prominently nerved beneath harsh and subcoriaceous, tendrils simple, cymes slender, petals $\frac{1}{12}$ in., fruit the size of a pea.

ASSAM, *Griffith.*

Stems very firm and rigid, turning black when dry; a hard harsh plant when compared with *V. glauca.* *Flowers* on slender pedicels. *Petals* distinct. *Style* $\frac{1}{12}$ in., stigma subcapitate. *Fruit* $\frac{1}{4}$ in., turbinate, dry, black, subangled, 1-seeded. *Seed* $\frac{1}{5}$ in. pyriform.—Very closely allied to *V. adnata.*

β. *Leaves pubescent or tomentose beneath.*

15. **V. gigantea,** *Bedd. in Trans. Linn. Soc.* xxv. 212; an enormous climber, branches terete round glabrous, leaves 6–8 in. cordate with a deep sinus and long point mucronate glabrous above subtomentose beneath, tendrils bifid.

WESTERN PENINSULA; Anamallay forests, alt. 2000 ft., *Beddome.*

Stems 4–5 in. diam., bark corky. *Leaves* crenate, crenatures sharply toothed, 5-nerved; petiole 2–4 in. *Cymes* 3–5-rayed, rays bearing minute green umbellate flowers.—I have never seen this species.

16. **V. repanda,** *W. & A. Prodr.* 125; stems and leaves with appressed woolly tomentum, leaves 4–8 by 3–6 in. broadly cordate coarsely crenate or dentate or inciso-serrate or sublobed often repand densely covered when young with rust-coloured hairs at length glabrous above, tendrils forked, petals cohering at the apex, fruit $\frac{1}{3}$ in. pyriform. V. læta, *Wall. Cat.* 6002. V. rosea, *Royle Ill.* 149, t. 26, f. 1. Cissus acuminata, *Thwaites Enum.* 62. C. aquosa, *Wall. Cat.* 6000. C. repanda, *Vahl; DC. Prodr.* i. 627; *Grah. Cat. Bomb. Pl.* 32; *Dalz. & Gibs. Bomb. Fl.* 39. C. repens, *Thwaites*

Enum. 62. C. riparia, *Wall. Cat.* 6038. C. vitiginea, *Linn. Sp. Pl.* 117; *DC. Prodr.* i. 627 (*not of Roxburgh*).

NORTH WESTERN HIMALAYA; Garwhal, *Falconer*, &c. ASSAM, SILHET, and EASTERN BENGAL; WESTERN PENINSULA, from the Concan southwards. CEYLON, not uncommon.

Branches coarse trailing or creeping. *Stems* and older branches with wrinkled bark. *Cymes* slender, peduncle 2–5 in. bearing 3–5 rays or branching subcorymbosely with the flowers ultimately umbellate. *Bracts* and bracteoles densely woolly. *Fruit* tipped with the persistent style. *Seed* pyriform, smoothish.—Very variable; the more succulent and glabrous forms closely resembling some specimens of *V. pallida*, while those with cordate-ovate leaves and less persistent bracteoles are with difficulty distinguished from *V. adnata*, to which indeed it is very closely allied. Under *V. paniculata*, Wall. Cat. 6022, are two species, the one with simple leaves probably belongs to *V. repanda*, the other with 5-foliolate leaves and labelled *C. pentaphylla?* Hb. Madras, belongs to *V. tenuifolia.*

17. **V. adnata,** *Wall. Cat.* 5998; stems leaves and inflorescence clothed with a rust-coloured pubescence, leaves 4–8 by 2–4 in. cordate-ovate acute or shortly acuminate bristly-serrate, tendrils forked, cymes smaller more compact and less woolly than in *V. repanda*, bracteoles very small caducous, petals distinct, fruit about the size of a pea. *Brand. For. Fl.* 100. V. repens, *Wall. Cat.* 5999 *b*. Cissus adnata, *Roxb. Fl. Ind.* i. 405; *DC. Prodr.* i. 627; *Wight Ic.* t. 144; *Thwaites Enum.* 62; *Cat. Bomb. Pl.* 32; *Dalz. & Gibs. Bomb. Fl.* 39. C. cordata, *Wall. Cat.* 6001. C. Kleinii, *Wall. Cat.* 6008 *in part*. C. latifolia, *Vahl Symb.* iii. 18.

Hotter parts of INDIA, from the WESTERN HIMALAYAS in Garwhal to ASSAM, SILHET, BENGAL, TENASSERIM, and PENANG. WESTERN PENINSULA and CEYLON.—DISTRIB. Java, Borneo, Philippine Islds.

A slender far-climbing plant, with round woody branches. *Leaves* becoming more or less glabrous above, always pubescent beneath, sometimes even densely felted with a short soft tomentum, membranous. *Tendrils* woody. *Fruit* black, smooth. *Seed* $\frac{3}{10}$ in., pyriform, smooth.

18. **V. spectabilis,** *Kurz in Trimen Journ. Bot.* 1874, 196; a lofty scandent ferruginously hirsute shrub, leaves almost sessile broadly cordate obtuse obsoletely 3–5-lobed sinuate-cordate at the base denticulate thick membranous scabrous above.

SIKKIM HIMALAYA; damp forests near Khersiong, alt. 5–6000 ft., *Kurz.*

Flowers very small, on slender pedicels $\frac{1}{12}$–$\frac{1}{4}$ in. *Cymes* pedunculate, trichotomous $\frac{1}{2}$–$1\frac{1}{2}$ in. *Calyx* truncate, scarcely $\frac{1}{24}$ in. *Style* $\frac{1}{24}$ in., truncate. *Berry* (immature) obovate.—According to Kurz this has the habit and affinity of *V. Linnæi*, but widely differs by the indumentum and almost sessile leaves.—I have not seen this species.

19. **V. Linnæi,** *Wall. Cat.* 5987; stems leaves and inflorescence clothed with a short grey pubescence, leaves 2–4 in. long and broad palmately 3–5-angled or lobed slightly cordate or retusely-truncate at the base coarsely and irregularly serrate, tendrils simple, petals distinct, fruit $\frac{1}{3}$ in. *W. & A. Prodr.* 126. Cissus angulata, *Lamk. Dict. Supp.* i. 104; *DC. Prodr.* i. 629; *Thwaites Enum.* 62.

WESTERN PENINSULA; from the Concan southwards, and CEYLON.

Stems and *leaves* subfleshy. *Branches* cylindric or very obtusely angled. *Cymes* slender, about as long as the leaves. *Flowers* small. *Fruit* oblong, bluish, pruinose; pedicels recurved. *Seed* as in *V. repanda*.—A very distinct species, of which the synonymy has been much confused. I have followed Wallich in calling it *V. Linnæi.*

†† *Flowers in long whip-like dichotomous spikes. Fruit 2-seeded.*

20. **V. macrostachys,** *Miq. Ann. Mus. Lugd. Bat.* i. 94. Cissus spicifera, *Griff. Notul.* iv. 693.

MALACCA; *Griffith, Maingay.*—DISTRIB. Sumatra.

Whole plant quite glabrous. *Leaves* 3–8 in., oblong or ovate, cuspidate, serrate, coriaceous, with prominent nerves. *Spikes* 2 ft. long. *Flowers* sessile or very shortly pedicelled, solitary or fascicled in twos or threes on the long slender pendulous rachis. *Petals* separating; style short. *Fruit* 1 in., elliptic, fleshy. *Seed* ⅔ by ⅓ in., oblong, pointed at the apex, the back rounded and narrowly grooved, the face flat, rugose.

** Petals and Stamens 5.

† *Flowers umbellately-cymose. Style* 0. *Fruit 2-seeded.*

21. **V. sikkimensis,** *Laws.;* whole plant glabrous, stems weak trailing, leaves 1½ ft. cordate, cymes small subfleshy glabrous or with a small amount of deciduous tomentum divaricately branched on long peduncles.

SIKKIM HIMALAYA and KHASIA MTS., alt. 0–4000 ft., *J. D. H. & T. T.*

Young parts often glaucous. *Leaves* membranous, denticulate, reddish. *Peduncles* 4 in. or more bearing a forked tendril a little below the cyme. *Petals* separating. *Fruit?*

22. **V. tomentosa,** *Heyne in Roth Nov. Sp.* 157; whole plant covered with a thick woolly persistent tomentum, leaves palmate 3–5-angled or lobed, flowers sessile in shortly peduncled compact densely woolly cymes. V. lanata, *Wall. Cat.* 5995 *a, ? f, ? g; W. & A. Prodr.* 130; *Wight Ill.* i. t. 57; *DC. Prodr.* 634. V. cinnamomea, *Wall. Cat.* 5989 *c.* V. trifida, *Roth Nov. Sp.* 157; *DC. Prodr.* i. 634. V. ternata, *Heyne in Roth Nov. Sp.* 157. V. triloba, *Heyne l.c.* 157; *Wall. Cat.* 6004 ? C.; *DC. Prodr.* i. 634. Ampelopsis ? ternata, *DC. Prodr.* i. 633.

WESTERN PENINSULA; from Canara southwards.

Leaves 3–9 in. *Flowers* scarlet, when dry dark brown, showing conspicuously in the midst of the white woolly tomentum. *Peduncles* 3–6 in., stout, woody, bearing a stiff woody forked tendril 1 in. below the cyme. *Fruit* ⅓ in., black, round. *Seed* ⅓ by ¼ in., broadly oblong, flat, the margin incurved, the face with a thick rounded ridge running down the middle, pale.

23. **V. nervosa,** *Laws.;* branches petioles and cymes glabrous, leaves cordate subpalmate, nerves beneath prominent and hairy, flowers sessile. V. rugosa, *Herb. Ind. Or. H. f. & T.* (*not of Wallich*).

SIKKIM HIMALAYA, alt. 4–5000 ft., *J. D. H.*

Stems deeply grooved, hollow. *Leaves* often nearly 2 ft., broadly cordate, rounded at the tip with 5–7 shallow lobes, coarsely and irregularly dentate, covered above with minute soft hairs. *Cymes* stoutish, bearing midway a 1–2-times forked tendril. *Fruit* the size of a currant, black, fleshy, pedicel ¼ in. *Seed* as in *V. tomentosa* but rather smaller, more pointed at the apex, and darker coloured.

24. **V. pedicellata,** *Laws.;* branches petioles and cymes covered with a short soft spreading pubescence, flowers on exceedingly slender pedicels ⅓ in.

WESTERN HIMALAYA; Kumaon, alt. 7000 ft., *Strach. & Wint.*

Stems striated, solid. *Leaves* 1 ft. or more, cordate-ovate, serrate or dentate, glabrous above, nerves somewhat prominent below and covered with short stiff spreading rusty hairs, very thin and membranous. *Cymes* very small, on a short slender peduncle bearing midway a weak simple tendril. *Fruit?*

†† *Flowers paniculately cymose.*

25. **V. erioclada,** *W. & A. Prodr.* 130; branches and petioles covered with a dense subdeciduous tomentum, leaves cordate-ovate coriaceous, flowers sessile and often almost hidden in the woolly tomentum, cymes compact or woody, peduncle 3–12 in. bearing two-thirds of the way a stout woody simple tendril. V. indica, *Thwaites Enum.* 63.—*Rheede Hort. Mal.* vii. t. 7.

Western Peninsula; *Rheede, Wight;* Ceylon, common up to 3000 ft.

Stem stout, hollow, cylindric, striate. *Leaves* 6–12 by 3½–7 in., acute or subacuminate, coarsely dentate, the teeth terminated by a hard obtuse point, at length quite glabrous above, nerves very prominent beneath. *Cymes* branching divaricately. *Petals* distinct. *Style* 0. *Fruit* oblong, about the size of a grape.

26. **V. barbata,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 478; branches petioles and peduncles covered with numerous long spreading glandular capitate hairs, leaves cordate-ovate membranous, peduncle flattened 4–8 in. bearing a long forked slender tendril above its middle, cymes regularly paniculate as long as the peduncle. V. latifolia, *Hb. Ham.; Wall. Cat.* 5994 ? G. V. lanata, *Hb. Roxb.; Wall. Cat.* 5995 *c, d.*

Khasia Mts., alt. 0–3000 ft.; Assam, Silhet, Pegu, and Tenasserim.

Branches stoutish, hollow, dark brown or nearly black. *Leaves* 8 in.–1 ft. or more, roundly cordate-ovate, sinuate-dentate, sometimes sublobed, at length glabrous above, puberulous or densely tomentose beneath. *Flowers* sessile in large lax ovate paniculate cymes. *Fruit* the size of a large currant, black, shortly pedicellate. *Seed* ⅖ by ¼ in., elliptic, the back flattish and shallowly grooved, the face rather sharply ridged, nearly smooth.—A very distinct species, known at once by the long spreading black hairs. Wallich describes the flowers as being 4-cleft, but although they may be so sometimes it is certain that they are generally pentamerous.

27. **V. lanata,** *Roxb. Fl. Ind.* i. 660; branches petioles and cymes more or less pubescent or tomentose, leaves cordate-ovate shortly acuminate membranous, peduncle bearing a simple or forked tendril, petals cohering at the top. *W. & A. Prodr.* 131; *Wall. Cat.* 5995 *a, b, e; Brand. For. Fl.* 99. V. cordifolia, *Roth Nov. Sp.* 158. V. indica, *Hb. Ham.; Wall. Cat.* 5994? E. V. Heyneana, *DC. Prodr.* i. 634. V. pentagona, *Hb. Ham.; Wall. Cat.* 5994 ? F. V. rugosa, *Wall. Cat.* 5994 *a, b, c, and d in part.* V. Labrusca, *Linn.* var. γ, *Regel. Conspect. Sp. Gen.* 9. Cissus vitiginea, *Roxb. Fl. Ind.* i. 406 (*note of Linnæus*). Alima ? cristatum, *Wall. Cat.* 4994.

Tropical Himalaya, from Kashmir and Jamu, alt. 1–4000 ft. and Kumaon, alt. 6–7000 ft., to Sikkim, alt. 1–5000 ft.; Assam, the Khasia Mts., Chittagong, Birma, and the Circars.

A very variable plant in the size shape and vestiture of the leaves, usually they are 3–6 by 1¾–3 in., sometimes larger, and usually softly pubescent, but sometimes felted beneath, or nearly glabrous. *Flowers* small, green, forming a thyrsoid paniculate cyme. *Petals* cohering at the apex rarely separating. *Fruit* the size of a large pea, round, purple, 4-seeded. *Seed* ⅙ by ⅛ in., obtriangular, subemarginate, rounded and smooth on the back with a small spathulate tubercle, face wedge-shaped with a shallow linear depression on each side of the ridge.—The following varieties may be distinguished:

Var. 1. *rugosa;* leaves ovate or cordate-ovate nearly 2 ft. clothed beneath with a dense matted tomentum; stems thicker than in the type with a dark deciduous bark.—Himalaya and Tenasserim.

Var. 2. *glabra;* leaves almost quite glabrous; stems more slender than in the type, approaching *V. parvifolia.*—Garwhal and Khasia Mts.

28. **V. latifolia,** *Roxb. Fl. Ind.* i. 661; whole plant quite glabrous, leaves roundly cordate 3–7-angled or lobed, peduncles shortish bearing a slender forked tendril, petals distinct, flowers small reddish-brown. V. Kleinii, *Wall. Cat.* 6008 ? C *and* ? D; *W. & A. Prodr.* 130; *Brand. For. Fl.* 99. V. glabrata, *Heyne in Roth Nov. Sp.* 156; *DC. Prodr.* i. 634. V. indica, *Wall. Cat.* 5993 ? C. V. zeylanica, *Russell Wall. Cat.* 5993 ? D.—*Rheede Hort. Mal.* vii. 13, t. 7.

North West India; Kumaon and Moradabad. Assam, Silhet, and the Western Peninsula from the Concan and Coromandel coast southwards.

Stems weak, hollow, far-climbing, striate; generally quite glabrous. *Leaves* 6–8 by 6–8 in. glossy. *Flowers* very small, in small somewhat compact thyrsoid cymes. *Peduncles* bearing a long wiry tendril a little below the cyme. *Style* 0. *Fruit* the size of a currant, black, 2-seeded. *Seed* ⅓–½ in., elliptical, with a linear tubercle on the back and the margins transversely rugose, bluntly ridged on the face.

29. **V. vinifera,** *Linn. Sp. Pl.* 202; stems and leaves much as in *V. latifolia*, but often tomentose, peduncles destitute of tendrils, petals united at the apex, style very short thick. *DC. Prodr.* i. 633; *W. & A. Prodr.* 130; *Grah. Cat. Bomb. Pl.* 33; *Brand. For. Fl.* 98.

Perhaps wild in the N.W. Himalaya; cultivated extensively in N.W. India and rarely in the Peninsula and Ceylon.—Distrib. Native of W. Asia.

Regel, in his *Conspectus Sp. Gen. Vitis. Amer. Bor. Chin. Bor. et Jap. Hab.* 9, considers this plant a hybrid between V. vulpina, *Linn.*, and V. Labrusca, *Linn.*, two American species, which he identifies with the Indian V. parvifolia, *Roxb.*, and V. lanata, *Roxb.*

††† *Flowers corymbosely cymose.*

30. **V. montana,** *Laws.*; stems slender, young branches with long delicate white spreading hairs otherwise glabrous, style 0.

Nipal, *Wallich* (*in Herb. Hook.*); Silhet, *Hook. f. & T.*

Leaves 8–12 by 6–8 in., cordate-ovate, or lobed as in *V. latifolia*. *Common peduncle* 3–5 in., bearing about an inch below the flowers a forked tendril; cymes small. *Petals* separating? *Fruit* ?—Very closely allied to *V. latifolia*, from which it differs only in the character of the cyme, and in the long white hairs on the younger portions of the stem.

31. **V. glandulosa,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 479; *Cat.* 6006; branches leaves and petioles covered with a short dusky pubescence, leaves cordate-ovate crenate sometimes 3-lobed, peduncles not bearing tendrils.

Nipal, *Wallich.*

Stems cylindric, solid, jointed and thickened at the nodes, with greyish dotted bark. *Leaves* 3–6 by 2–4 in. *Flowers* in small dichotomous corymbose cymes shorter than the leaves. *Fruit* small, globose, dark-purple, 3–4-seeded. *Seed* as in *V. lanata.*—According to Wallich the peduncles sometimes bear a twice or thrice dichotomous tendril.

†††† *Flowers spicately or racemosely-cymose.*

32. **V. parvifolia,** *Roxb. Fl. Ind.* i. 662; whole plant quite glabrous, leaves 2–4 in. membranous, flowers minute green pedicellate, style distinct. *Wall. Cat.* 6005; *Brand. For. Fl.* 99. V. truncata, *Miq. Fl. Ind. Bat.* i. ii. 609. V. vulpina, *Linn.* var. γ, *Regel Conspect. Sp. Gen. Vitis,* 6. V. Wallichii, *DC. Prodr.* i. 634. ? V. Purani, *Don Prodr.* 188.

NORTH WESTERN HIMALAYA; from Kashmir to Nipal, alt. 3–6000 ft.; EASTERN BENGAL, *Roxburgh*.—DISTRIB. Malay Archipelago, China, Japan.

Stems solid, trailing, slender. *Leaves* ovate, acute, base truncate or cordate, sharply and deeply serrate, often 3-lobed. *Tendrils* branched. *Flowers* in erect racemes 1 in. long. *Petals* cohering. *Style* very short. *Fruit* globose, black, the size of a pea. *Seed* as in *V. lanata.*

33. **V. indica,** *Linn., Sp. Pl.* 202; branches leaves and peduncles covered with a dense woolly tomentum, leaves 4–10 in. coriaceous, flowers greenish-purple nearly sessile, style 0. *Roxb. Fl. Ind.* i. 660; *W. & A. Prodr.* 131; *DC. Prodr.* i. 634; *Grah. Cat. Bomb. Pl.* 33; *Wall. Cat.* 5993. Vitis rugosa, *Wall. Cat.* 5994 *in part; Brand. For. Fl.* 100. *Rheede Hort. Mal.* vii. 11, t. 6.

WESTERN PENINSULA; from the Concan southwards.

Stems slender, permanently woolly. *Leaves* at length glabrous and shining above, cordate-ovate, acute, denticulate-serrate, the points of the serratures hard almost spiny. *Peduncles* stoutish, bearing a long simple tendril. *Flowers* in short cylindric spikes about 2 in. *Petals* distinct? *Fruit* globose, the size of a large currant, 2–4-seeded. *Seed* ⅓ by ¼ in., elliptic, slightly curved on the back from end to end, otherwise flattish, with a spathulate tubercle, the face wedge-shaped.—Very closely allied to *V. erioclada* in general appearance. In some specimens the flowers are 4-merous. *V. indica*, Miq. Fl. Ind. Bat. i. pt. ii. 609, and of Thwaites, are quite distinct.

††††† *Flowers in short racemose spikes at the end of long filiform tendrils bearing peduncles.*

34. **V. gracilis,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 477; *Cat.* 6007.

SINGAPORE, *Wallich*.

Branches exceedingly slender, almost filiform, pubescent. *Leaves* 4–5 by 2–2½ in., cordate, caudate-acuminate, sharply serrate, hispidly hirsute above both on the nerves and on the intercostal spaces, beneath on the nerves only. *Tendrils* short, very slender, simple. *Flowers?* *Fruit* (immature?) oblong, oblique, 1–4-seeded, sessile. *Seeds* ½ by ¼ in., oblong-triangular, rounded on the back, the face flattened.—Not unlike some forms of *V. lanata*, but differing in the nature of the pubescence and in the character of the inflorescence.

SECT. II. *Leaves* 3-foliolate. (*See* V. dubia, V. Hookeri, V. lanceolaria, V. pedata, V. tuberculata, and V. sulcata.)

* Petals and Stamens 4.

† *Stems and leaves usually fleshy.*

35. **V. Rheedei,** *W. & A. Prodr.* 127; whole plants quite glabrous, petiole 2–3 in. V. heterophylla, *Wall. Cat.* 6036. Cissus heterophylla, *Herb. Madr., Wall. Cat.* 6036 (*not of Poiret*). C. trilobata, *Lamk. Dict.* i. 31; *DC. Prodr.* i. 629; *Thwaites Enum.* 62; *Graham Cat. Bomb. Fl.* 33; *Dalz. & Gibs. Bomb. Fl.* 39.—*Rheede Hort. Mal.* vii. t. 45.

WESTERN PENINSULA; Malabar and Travancor. CEYLON, common.

Stems thick and weak. *Leaves* 4–8 in., the upper ones smaller three-lobed or entire; leaflets 2–5 in., shortly petioluled or sessile, the central one oblong-lanceolate, the lateral ones exceedingly oblique, all distantly often sharply toothed. *Tendrils* simple, woody. *Flowers* subumbellate, forming compact divaricating cymes 1½ in. long, usually shorter than the petiole. *Petals* distinct. *Style* slender, conspicuous. *Fruit* globose, 1-seeded, the size of a currant, black? *Seed* ⅓ by ¼ in., globose, smooth; testa brittle.

36. **V. setosa,** *Wall. Cat.* 6009; whole plant covered with long glandular bristly hairs without other pubescence, leaves sessile, fruit red. *W. & A. Prodr.* i. 127; *Wight Ic.* t. 170; *Dalz. & Gibs. Bomb. Fl.* 41. Cissus acida, *Wall. Cat.* 6009, *b.* (*not L.*) C. setosa, *Roxb. Fl. Ind.* i. 410; *DC. Prodr.* i. 630.

WESTERN PENINSULA; from the Circars and Maisor southwards. CEYLON, south part of the Island, *Gardner*.

Stem and *leaves* very fleshy, herbaceous, weak. *Leaflets* 1–2 in., sessile or shortly stalked, ovate or subovate, rounded at the tip, sharply and irregularly serrate-dentate. *Tendrils* usually forked, succulent. *Flowers* $\frac{1}{12}$ in. long, umbellately disposed in divaricating cymes. *Cymes* on peduncles as long as or longer than the leaves. *Petals* revolute. *Fruit* the size of a pea, when young often hairy, 1-seeded. *Seed* subglobose, nearly smooth.—Every part of the plant is exceedingly acrid.

37. **V. carnosa,** *Wall. Cat.* 6018; whole plant when young covered with a short dense pubescence, leaves petioled, fruit black. *W. & A. Prodr.* 127; *Wight Ic.* 171; *Brand. For. Fl.* 101. V. crenata, *Wall. Cat.* 6021. V. trifolia, *Linn. Sp. Pl.* 203. Cissus acida, *Roxb. Ic. ined.* 541. C. auriculata, *Roxb. Wall. Cat.* 6031 *b.* C. carnosa, *Roxb. Fl. Ind.* i. 409; *DC. Prodr.* i. 630; *Grah. Cat. Bomb. Pl.* 33; *Dalz. & Gibs. Bomb. Fl.* 40. C. crenata, *Vahl DC. Prodr.* i. 631. C. cinerea, *Lamk.; DC. Prodr.* i. 631. C. obtusifolia, *Lamk. Dict.* i. 31?—*Rheede Hort. Mal.* vii. t. 9.

TROPICAL HIMALAYA and throughout the hotter parts of INDIA from the PANJAB and BIRMA to CEYLON and MALACCA.

Stems more slender and less succulent than in *V. setosa*. *Leaves* 2–6 in. on long petioles; leaflets usually shortly stalked, 1–3 in., ovate or obovate, rounded or acute, serrate or dentate. *Tendrils* opposite the leaves, slender, wiry, usually branched. *Flowers* white, larger than in *V. setosa*, umbellately cymose, the peduncle equalling the petiole. *Style* conspicuous. *Fruit* turbinate, fleshy, 2–4-seeded. *Seed* $\frac{1}{4}$ by $\frac{1}{6}$ in. triangular, round on the back and with a linear tubercle, wedge-shaped on the face.

†† *Stems woody.*

a. Fruit under $\frac{1}{2}$ in. diam. round or ovoid (doubtful in V. subicaulis *and* V. anamallayana).

38. **V. bracteolata,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 483; *Cat.* 6023; stems smooth, flowers minute numerous, peduncles and pedicels filiform.

SILHET, *De Silva;* BHOTAN and ASSAM, *Griffith*.

Stems and leaves glabrous. *Branches* very slender. *Leaves* 3–5 in.; petiole nearly as long as the leaflets; leaflets nearly sessile or shortly stalked, lanceolate or ovate-lanceolate or ovate-acute, serrate, membranous or subcoriaceous. *Flowers* far the smallest of the genus, disposed in pubescent divaricating filiform cymes. *Cymes* on a long slender peduncle. *Style* 0. *Fruit* the size of a pea, round, black, 2–3-seeded. *Seed* $\frac{1}{4}$ by $\frac{1}{6}$ in., obovoid or globose, finely muricate.

39. **V. angustifolia,** *Wall. Cat.* 6033; stems smooth, cymes usually under 1 in. long shorter than the petiole, flowers diœcious, larger than in *V. bracteolata*, fruit the size and colour of a black currant 1–2-seeded, seed hemispherical hollow, pale. *Wight Ic.* 176. Cissus angustifolia, *Roxb. Fl. Ind.* i. 408; *DC. Prodr.* i. 631. C. trifoliata *Hb. Ham. in Wall. Cat.* 6013? K.

ASSAM, SILHET, and the KHASIA MTS.—DISTRIB. Sumatra (*Roxburgh*), Hongkong.

Stems flexuous, dark-coloured, glabrous. *Leaves* 3–6 in.; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in.; leaflets shortly stalked, lanceolate, serrate, glabrous, membranous. *Tendrils* simple.

Cymes usually nearly sessile, very much smaller and more robust than in the last species. *Flowers* green. *Style* 0; stigma large flat. *Fruit* dry, 2–4-seeded. *Seed* $\frac{1}{4}$ in. diam., girt about the middle by a ridge, hollow, the small opening closed by a thin membrane closely resembling that of *V. Roxburghii.*—Specimens from Assam have leaves 8 in. long or more; and the cymes on longer petioles and more diffuse.

40. **V. canarensis,** *Dalz. in Hook. Kew Journ. Bot.* iii. 123; stem herbaceous pale warted, cymes about 2 in. shorter than the petioles, fruit $\frac{1}{4}$ in. globose nearly smooth.

WESTERN PENINSULA; Canara, *Dalzell.*

Leaves 7–8 in.; petiole 3–3$\frac{1}{2}$ in.; leaflets 4 by 2 in., shortly stalked, elliptic, pubescent on both surfaces, at length glabrous. *Petals* distinct. *Style* short, stigma acute. —Very closely allied to *V. lanceolaria,* of which it may prove to be a broad-leaved variety.

41. **V. Roxburghii,** *W. & A. Prodr.* 127 (*excl. synonyms*); quite glabrous, stems slender, bark smooth black shining, cymes longer than the petioles, fruit the size of a currant 2–4-seeded, seeds hemispheric hollow cup-shaped, the opening closed by a membrane.

WESTERN PENINSULA; Courtallam, *Wight.*

Leaves 5–8 in., glossy, glabrous, very membranous; petiole 2 in.; leaflets 3–7 in., stalks $\frac{3}{4}$–1 in., elliptic-lanceolate, acute or subacuminate, entire. *Tendrils* simple, long, slender. *Cymes* shortly pedunculate, 3–4 in., branches divaricating. *Flowers* small, green. *Style* conspicuous.—The seed closely resembling that of *V. pedata,* but a little larger and darker-coloured.

This, by inspection of the specimen in Wight's herbarium, I have determined to be undoubtedly Wight and Arnott's species, although in the description they say that the cymes are much shorter than the petioles, almost approaching a panicle, and the leaves occasionally 4–5-foliolate. Roxburgh's *Cissus feminea,* which they identify with it, and owing to which the specific name of *Roxburghii* was given to Wight's plant, is *V. lanceolaria.*

42. **V. reticulata,** *Thwaites Enum.* 63 (Cissus); stems slender, whole plant quite glabrous, cymes longer than the petioles, leaves prominently reticulated, fruit ovoid the size of a cherry pale rose-coloured.

CEYLON; in the Ambagamowa district, *Thwaites.*

Leaves 6–8 in.; petiole 1$\frac{1}{2}$–2$\frac{1}{2}$ in.; leaflets 4–6 in., stalks $\frac{1}{3}$–1 in. long, broadly elliptic-ovate, cuspidate, the upper half obscurely denticulate, membranous. *Flowers ? Seed* $\frac{1}{3}$ in.—Thwaites remarks that this species is closely allied to some forms of *V. pedata,* differing from it chiefly in the form and character of the leaves, and larger fruit; the trifoliolate character of the leaves he suggests may not be constant.

43. **V. peduncularis,** *Wall. Cat.* 6024; stems exceedingly coarse thick and woody, young branches cymes and petioles puberulous, cymes 6 in. diffuse equalling the petioles, fruit the size of a pea red, seed $\frac{1}{4}$ by $\frac{1}{5}$ in. triangular-obovoid emarginate coarsely angled or muricate pale.

PENANG, *Wallich;* MALACCA, *Maingay.*

Leaves 1 ft. long; petiole 6 in.; leaflets elliptic, or subobovate, acute or rounded at the apex, coarsely dentate-serrate, at length glabrous, coriaceous. *Tendrils* simple, stout. *Cymes* 6 in. long; peduncle 2 in. *Flowers* very small, often unisexual. *Fruit* globose, black, pruinose, 4-seeded.

44. **V. himalayana,** *Brand. For. Fl.* 100; quite glabrous the younger parts subfleshy, stem robust, lateral leaflets very oblique, cymes as long as the leaves, flowers large, fruit the size of a pea black, seed $\frac{1}{4}$ by $\frac{1}{4}$ in. roundly obovoid nearly smooth polished black. Vitis

(Ampelopsis) neilgherrensis, *Wight Ic.* t. 965. Ampelopsis himalayana, *Royle Ill.* 149. Cissus himalayana, *Walp. Rep.* i. 441.

Temperate Himalaya, from Kashmir, alt. 6–9000 ft., to Sikkim, alt. 6–11,000 ft. Khasia Mts., alt. 2–4000 ft. Pegu, *Kurz.* Western Peninsula; Pulney Mts., *Wight.*

Bark smooth, or on the older branches with a few small warts. *Leaves* 3–8 in., membranous or subcoriaceous, often glossy; petiole $1\frac{1}{2}$–4 in.; leaflets 2–5 in., sharply or inciso-serrate, the terminal ovate or obovate, rounded at the base or subcordate, acuminate, lateral $\frac{1}{2}$-ovate or $\frac{1}{2}$-cordate. *Tendrils* 0. *Flowers* $\frac{1}{8}$ in., in subcorymbose dichotomous cymes, rarely 5-merous. *Style* short, stout. *Fruit* 4-seeded.

Var. *semicordata,* Wall. in Roxb. Fl. Ind. ed. Carey, ii. 481 (species); young branches petioles and the nerves beneath the leaves hispidly pubescent, leaves smaller than in the type, tendrils sometimes present branched, *Wall. Cat.* 6020. Himalaya and Khasia Mts.—Perhaps this ought not to be distinguished even as a variety.

45. **V. anamallayana,** *Beddome in Trans. Linn. Soc.* xxv. 213; a very large glabrous climber, petiole 1–2 in., leaflets $3\frac{1}{2}$–4 in. ovate-lanceolate with a long acumination sharply serrate conspicuously reticulate beneath, peduncles shorter than the petioles, cymes lax.

Western Peninsula; banks of rivers on the Anamallay hills, alt. 5000 ft., *Beddome.*

Leaves of the younger branches simple, ovate-lanceolate, of the older usually trifoliolate; petiole glandular; leaflets nearly equal.—The description is too imperfect to determine with exactness the proper affinities of this species.

46. **V. Gardneri,** *Thwaites Enum.* 63 (Cissus); branches terete rufescent, petioles about 1 in., leaflets 2–3 in. by 1–$1\frac{1}{4}$ in., cymes few-flowered rufescent much longer than the petioles, fruit the size of a pea blackish-purple.

Ceylon; Matele and Hunasgirie district, *Thwaites.*

Leaflets glabrous, ovate-lanceolate, repand-dentate, cuneate at the base, lateral leaflets oblique, smaller. *Stipules* cordate-oblong, adnate.

b. Fruit globose, 1 *in. or more in diameter.*

47. **V. mollissima,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 482; stems slender when young covered with long hispid hairs, leaves hairy on both surfaces, style long slender, fruit dry 1 in. diam. *Wall. Cat.* 6012.

Penang, *Wallich; Malacca, Griffith, Maingay.*

Stems at length glabrous. *Leaves* 5–8 in., covered with long soft dense hairs, membranous; petiole 2–$3\frac{1}{2}$ in.; leaflets ovate or oblong-ovate, acute or subacuminate, faintly serrate, lateral very oblique. *Tendrils* very slender, forked. *Flowers* about $\frac{1}{12}$ in., long peduncled, divaricating cymes equalling the petioles. *Fruit* 2–3-seeded. *Seed* $\frac{3}{4}$ by $\frac{1}{3}$ in., elliptic-oblong, boat-shaped, rounded and polished on the back and with a linear tubercle hollow on the face.—Wallich describes the fruit as being "nearly the size of a cherry;" but the ripe ones in specimens from Malacca are very much larger.

48. **V. tuberculata,** *Blume Bijd.* 189 (Cissus); stem very warty glabrous, leaves quite glabrous coriaceous, style very short, stigma subpeltate, fruit dry $1\frac{1}{2}$ in. diam.

Pegu, *McClelland.*—Distrib. Java.

Whole plant quite glabrous. *Leaves* 8 in. to 1 ft.; petiole 24 in.; leaflets shortly stalked, narrowly ovate-lanceolate, shortly acuminate, entire or very faintly serrate towards the tip, margin slightly revolute. *Tendrils* simple or forked. *Flowers* very small, in dense compact cymes under 1 in., almost sessile. *Fruit* on very short thick pedicels, dry, membranous, brown, 1–3-seeded. *Seed* $\frac{3}{4}$ by $\frac{1}{3}$ in., obovoid emarginate, grooved on the back and in the groove a long linear tubercle, the raphe also lying in a groove on the face.—According to Blume, the leaves are sometimes 4–5-foliolate.

c. Fruit oblong subfalcate, ½ in. long.

49. **V. campylocarpa,** *Kurz mss.;* whole plant quite glabrous, fruit 1-seeded, seed ½ by ¼ in. cylindrical curved transversely wrinkled, style 0, stigma large subpeltate.

ASSAM, *Griffith;* PEGU, *Kurz.*

Stems round. *Leaves* 6–8 in., coriaceous; petiole 2½–4 in.; leaflets stalked, obovate, suddenly and shortly acuminate, faintly serrate towards the tip. *Tendrils* 0. *Flowers* in nearly sessile very diffuse widely divaricating cymes longer than the petiole. *Fruit* dark-brown, not pulpy, pericarp reduced to a thin membrane.

** *Petals and stamens* 5.

50. **V. divaricata,** *Wall. in Hb.* 1824; *ex Cat.* 5994 *h* under V. rugosa; whole plant covered with deciduous down, stems cylindric, leaves 6 in.–1 ft., terminal leaflet ovate acute or subacuminate lateral semi-cordate.

TEMPERATE HIMALAYA, from Garwhal and Kumaon, alt. 6–700 ft., to E. Nepal, alt. 3–4000 ft.; MAISOR, *Herb. Rottler.*

Stems slender, far-climbing. *Leaves* thinly membranous, 3- rarely 5-foliolate; petiole 3-4 in.; leaflets serrate, at length glabrous or nearly so. *Flowers* dark-brown or red, in small compact umbellate cymes on long woolly peduncles, which bear a forked tendril about 1 in. from the top. *Style* very short. *Fruit* globose, the size of a currant, black, 3–4-seeded. *Seed* ⅓ by ¼ in., almost round, flat, emarginate, pale coloured.—Wight & Arnott unite this with *V. tomentosa,* to which it is very closely allied, but differs sufficiently in the composition and texture of the leaves.

51. **V. araneosus,** *Dalz. & Gibs. Bomb. Fl.* 41?; whole plant covered with a deciduous down except on the under surface of the leaves where it is persistent, stems flattened, leaves 4–6 in., terminal leaflet elliptic, lateral semi-elliptic.

WESTERN PENINSULA; highest Ghats of the Concan; Pulney Mts., *Wight.*

Stems slender, far-climbing. *Leaves* membranous; petiole 1–2 in.; leaflets shortly-stalked, serrate, at length glabrous above, felted beneath. *Flowers* and *fruit* as in *V. divaricata.* *Seeds* ⅓ by ⅙ in., elliptic, with a round depression on the back, puckered round the margins.

SECT. III. *Leaves* mostly 5-foliolate, digitate. (See 58, *cinnamomea.*)

† *Flowers umbellate hardly cymose.*

52. **V. obtecta,** *Wall. Cat.* 6026; branches rooting, young branches petioles and peduncles clothed with soft villous red hairs, petioles 1½–2½ in., leaflets all under 4 in., flowers 4-merous. V. hederacea, *Wall. Cat.* 6019, *in part.*

WESTERN HIMALAYA, from Kumaon, alt. 6000 ft., *Thomson;* to Nipal, *Wallich.*—DISTRIB. Yunan.

Young branches very slender, creeping, older with a roughish bark and covered with numerous short aerial rootlets. *Leaflets* ovate or obovate, sessile or nearly so, serrate, glabrous, membranous, lateral much smaller than the terminal. *Tendrils* branched, very slender, short. *Flowers* unisexual, ⅛ in. long. *Style* 0, stigma flat. *Fruit* immature, the size of a currant, globose, 1-seeded, black? *Seed?*

†† *Flowers umbellate in divaricating subcorymbose cymes.*

53. **V. Thomsoni,** *Laws.;* stems cylindric slender, whole plant glabrous, leaves glaucous deep green, petiole 2–3 in., leaflets 3–4 by 1½–2 in.

elliptic-lanceolate serrate pale beneath, flowers 4-merous, seed dark pinkish-red.

Khasia Mts., alt. 4–6000 ft., *H. f. & T.*

A low creeper, turning red. *Leaflets* narrowed into short stalks. *Tendrils* stoutish, branching. *Flowers* in slender widely divaricating cymes, green. *Style* subulate. *Fruit* the size of a currant, globose, 2–4-seeded, pruinose. *Seed* ¼ in., obovoid, rounded on the back, wedge-shaped on the face.

54. **V. elongata**, *Wall. Cat.* 6016; whole plant quite glabrous, branches slightly flattened thick and succulent polished, petioles 5–8 in., leaflets 5–7 by 2–2½ in. elliptic-lanceolate shortly acuminate serrate membranous narrowed into a stalk, flowers 4-merous. Cissus elongata, *Roxb. Fl. Ind.* i. 411; *W. & A. Prodr.* 128.

Sikkim Himalaya, alt. 1–5000 ft., Silhet and Bengal; Coromandel, *Roxburgh.*

A very large climber running up and over the highest trees. *Branches* few or 0 until the plant arrives at a great height. *Tendrils* simple. *Cymes* di-trichotomous, the last divisions short ending in small umbels. *Style* short. *Fruit* 1 by ½ in., elliptic, smooth, black, 1-seeded. *Seed* ¾ in., obovate, smoothish.—Wight & Arnott say that the leaves in this species, as also in the next, are sometimes pedate.

55. **V. auriculata,** *Roxb. Fl. Ind.* i. 411 (Cissus); branches cylindric succulent the young parts softly pubescent, petioles 4–7 in., leaflets on long stalks 2–6 by 1–4 in. obovate acute or shortly acuminate serrate membranous, flowers 4-merous. *Wall. Cat.* 6031; *W. & A. Prodr.* 129, *in part; Wight Ic.* 145. Cissus auriculata, *DC. Prodr.* i. 632; *Dalz. & Gibs. Bomb. Fl.* 40.

Sikkim Himalaya; alt. 3–5000 ft., and Chittagong, *H. f. & T.;* Bengal and Birma, *Wallich;* Maisor, *Heyne.*

A large climber like *V. elongata. Bark* of the older stems spongy and deeply cracked. *Leaves* softly pubescent beneath when young, at length glabrous; stipules large, ear-shaped. *Tendrils* 2–3-cleft. *Flowers* small. *Cymes* on long thick weak succulent peduncles, divaricating, longer than the petiole. *Fruit* the size of a cherry, globose, red, 1-seeded. *Seed* elliptical, rounded at the base, ¾ by $\frac{5}{12}$ in.—None of the leaves in the many specimens I have met with are pedate, as Wight & Arnott say; indeed, the specimens in Wight's herbarium numbers 427 and 967 do not belong to this species, but to *V. lanceolaria.*

56. **V. planicaulis,** *Hook. f. in Bot. Mag.* t. 5685; whole plant quite glabrous, stems greatly flattened, petioles 4–7 in., leaflets on stalks ¾–1½ in. 5–8 by 2–3 in. oblong-lanceolate subacuminate obtusely-serrate membranous or subcoriaceous, flowers 4-merous.

Sikkim Himalaya, and Khasia Mts., alt. 3–4000 ft.

A vast climber reaching to the top of the highest trees, and sending down from its branches long thin leafless bands. *Stems* at the base often 1½ ft. wide and 1 in. thick. *Tendrils* stout, simple. *Flowers* green. *Cymes* subcorymbose with divaricating branches. *Style* subulate; stigma 4-lobed. *Fruit* the size of a cherry, round, red? 1–2-seeded. *Seed* ½ by ¼ in., nearly cylindrical, transversely rugose.

57. **V. obovata,** *Laws.;* branches petioles peduncles and tendrils clothed with a long soft spreading fulvous pubescence, stems much flattened, petiole 4–7 in., leaflets 6–10 in. stalked glabrous except upon the stalks obovate acute or subacuminate distantly and coarsely serrate.

Khasia Mts., alt. 3–4000 ft., *H. f. & T.*

Tendrils stout, simple, very long. *Cymes* shortly pedunculate, subcorymbose with divaricating branches. *Flowers?* *Fruit* the size of a cherry, globose, 2-seeded.

Seeds $\frac{1}{2}$ in., obovoid?—Probably a tall climber like the last species. These five last species, though easily distinguishable by the characters given above, are very closely allied.

††† *Flowers in long pendulous racemose woolly spikes.*

58. **V. cinnamomea,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 483; *Cat.* 5989, *in part*; stems covered with a thin yellowish or pale rust-coloured closely adhering tomentum, leaves simple to 3-foliolate at length glabrous above felted beneath, spikes spreading or ascending, fruit triangular-obcordate 1-seeded, seeds $\frac{1}{3}$ by $\frac{1}{4}$ in. broadly obcordate.

Malacca, Penang, and Sincapore, *Wallich*, &c.

Apparently a large climber. *Stems* slender, cylindric, woody. *Leaves* usually 3-foliolate; petiole 3–6 in., sometimes simple, 3-lobed, cordate; leaflets narrowed into a very short stalk, $3\frac{1}{2}$–8 by 2–3 in., terminal elliptic, lateral half-cordate, sharply and bristly serrate. *Racemes* cirrhiferous, very slender. *Seed* curved with a small round tubercle on the back, margins muricate.—The more slender habit, the thinness of the tomentum, the 1-seeded fruit and the shape of the seed, all point to this being distinct from *V. compositifolia.*

59. **V. compositifolia,** *Laws.*; stems covered with a very thick rust-coloured tomentum, leaves 5-foliolate glabrous above or tomentose on the principal nerves only densely felted beneath, spikes spreading very densely woolly, fruit $\frac{3}{4}$ by $\frac{1}{3}$ in. 4-angled 4-seeded, seed elliptic acute at the apex emarginate at the base slightly curved flattish and smooth on the back sharply ridged on the face. V. cinnamomea *var.* compositifolia, *Wall. Cat.* 5989 B.

Penang, *Phillips*; Malacca, *Maingay.*

A vast climber, with thick branches. *Petioles* 6–10 in.; petiolules 1 in.; leaflets 6–10 by $2\frac{1}{2}$–$3\frac{1}{2}$ in., narrowly obovate, sharply and bristly serrate, cuspidate, coriaceous. *Racemes* 2 ft., much more robust than in *V. cinnamomea*, cirrhiferous. *Fruit* black, pulpy.

60. **V. elegans,** *Kurz in Nat. Tydsch. v. Ned. Ind.* (*see Journ. Beng. As. Soc.* 1870, pt. i. 74); stems covered with a very dense dark red woolly tomentum, leaves 3–5-foliolate velvety above densely felted beneath, spikes reflexed. V. cinnamomea. *Wall. Cat.* 5989, *in part.* V. coralloides, *Hook. f. mss.*

Sincapore, *Walker*, &c.

Petioles 2–$2\frac{1}{2}$ in.; leaflets 3–6 by $1\frac{3}{4}$–3 in., sessile, obovate, bristly serrate. *Tendrils* opposite the leaves or springing from the peduncle. *Fruit?*—Much like *V. compositifolia*, but more robust, the tomentum also is darker denser and persistent on the upper surface of the leaves.

Sect. IV. *Leaves* mostly pedately 5-foliolate. *Flowers* 4-merous.

† *Flowers umbellately cymose.*

61. **V. capriolata,** *Don Prodr.* 188; whole plant quite glabrous, stipules and bracts scarious, style 0, stigma large flat. V. serrulata, *Wall. Cat.* 6034 *a.* V. hederacea, *Wall. Cat.* 6019, *in part.* C. capriolata, *Royle Ill.* t. 26. C. serrulata, *Roxb. Fl. Ind.* i. 414; *DC. Prodr.* i. 632. C. napaulensis, *DC. Prodr.* i. 632.

Temperate Himalaya; from Garwhal? alt. 4–7000 ft., to Sikkim and Bhotan., alt. 5–8000 ft. Khasia Mts., alt. 4–6000 ft. Chittagong, *Roxb.*

Stems very slender, wiry. *Leaves* 5-foliolate; petiole $1\frac{1}{2}$–$2\frac{1}{2}$ in.; leaflets $1\frac{1}{2}$–3 by $\frac{1}{2}$–$1\frac{1}{4}$ in., lanceolate or narrowly ovate or subobovate, acute or subacuminate, bristly-seed $\frac{1}{8}$ in. diam. hemispherical hollowed out on the flat side and the opening closed by a thin membrane. *W. & A. Prodr.* 128. Cissus heptaphylla, *Retz Obs.* 22. C. pedata, *Lamk.*; *Roxb. Fl. Ind.* i. 413; *DC. Prodr.* i. 632; *Grah. Cat. Bomb. Pl.* 33; *Dalz. & Gibs. Bomb. Fl.* 40; *Thwaites Enum.* 63. C. serratifolia, *Hb. Rottl.* Melothrix zeylanica, *Kœn. in Hb. Banks.*—*Rheede Hort. Mal.* vii. t. 10.

Bengal, Silhet, Assam, the Khasia Mts., alt. 0–3000 ft. Birma and from Tenasserim to Singapore and Penang. Western Peninsula, from the Concan southwards, and in Ceylon.—Distrib. Malayan Archipelago.

A large weak climber, with cylindric often hirsute branches. *Leaves* usually 7-foliolate; petiole 4–6 in.; leaflets on long stalks, 4–8 by $1\frac{1}{2}$–3 in., oblong-lanceolate, acuminate, serrate, often at length nearly glabrous. *Cymes* subcorymbose with widely divaricating branches. *Flowers* bisexual, green, covered with a greyish pubescence. *Fruit* subglobose, somewhat flattened at the apex.—The seed resembles exactly that of *V. Roxburghii*, but is rather smaller.

70. **V. novemfolia,** *Wall. Cat.* 6030; whole plant glabrous, branches cylindric smooth, leaves membranous, tendrils forked, cymes on very long peduncles nearly as long as the leaves, fruit $1\frac{1}{4}$ in. diam. pulpy 4-seeded, seed $\frac{2}{3}$ by $\frac{5}{12}$ in. boat-shaped with the ends slightly curved inwards hollow the elliptic opening closed by a thin membrane.

Singapore, *Wallich, Griffith.*

Stems dark-brown, shining. *Leaves* pedately 7–9-foliolate; petiole 4–6 in.; leaflets 5–8 in., on long stalks, oblong-lanceolate, entire. *Peduncles* longer than the petioles. *Flowers* small, green. *Fruit* globose, black.

†† *Flowers in long slender pendulous racemose spikes.*

71. **V. Helferi,** *Laws.*; stems cylindric somewhat slender the young parts covered with a pale deciduous tomentum, leaves 5–7-foliolate glabrous except on the nerves beneath, petiole 3–4 in., leaflets 3–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in. shortly stalked broadly oblanceolate serrate submembranous.

Tenasserim or Andaman Isls., *Helfer.*

Peduncles opposite the leaves, cirrhiferous. *Racemes* 1 ft. or more long, very slender. *Flowers* glabrous, black when dry, subquadrangular. *Style* 0, stigma minute. *Fruit?*

72. **V. polystachya,** *Wall. Cat.* 6028, *in part*; stems cylindric very coarse and thick speedily becoming covered with a thick corky bark, whole plant quite glabrous with the exception of the spikelets which are slightly puberulous, petiole 6 in., leaflets mostly 6–12 by 3–4 in. elliptic-oblong cuspidate distantly serrate on long stalks coriaceous.

Tenasserim or Andaman Isls., *Helfer*; Malacca, *Griffith, Maingay.*—Distrib. Siam.

Peduncles opposite the leaves, robust, cirrhiferous. Tendrils stout. Racemes, 2 ft.; spikelets 2 in., covered with a short slight appressed pubescence. *Flowers* glabrous, black when dry. *Petals* united. *Style* very short. *Fruit* (immature) $\frac{3}{4}$ in. diam., globose, succulent. *Seed?*

73. **V. nitida,** *Laws.*; stems cylindric smooth, bark shredding, whole plant quite glabrous, petiole 4–6 in. leaflets 7 on long stalks 8–10 by 3–4 in. elliptic-oblong acute distantly and faintly serrate shining beneath membranous, stipules large broadly ovate. V. polystachya, *Wall. Cat.* 6028 *in part* and 9031.

Penang, *Wallich.*—Distrib. Siam.

Peduncles opposite the leaves, robust, $1\frac{1}{2}$ ft., cirrhiferous, quite glabrous. *Flowers* small, black when dry, subquadrangular. *Petals* united? *Style* very short. *Fruit?*—

These 3 last species are closely allied to *V. cinnamomea* and *V. elegans*, and with them form the binding link between this genus and *Pterisanthes*.

SECT. VI. *Leaves* 1–3-pinnate.

74. **V. rubifolia,** *Wall. in Roxb. Fl. Ind. ed. Carey*, ii. 480; *Cat.* 6037; branches and younger parts pubescent, leaves pinnate, leaflets closely and sharply serrate.

KHASIA MTS., alt. 4–5000 ft., *De Silva*, &c.; SILHET, *Wallich*. ASSAM, *Masters*.

A large climbing shrub, branches slender, angular. *Leaves* 6–9 in.; leaflets 2½–3½ by 1–2¼ in., shortly stalked, 3–5-paired, subcordate-ovate, acute or subacuminate. *Tendrils* forked, glabrous above, pubescent beneath. *Flowers* small, green, umbellate in slender dichotomous subcorymbose cymes. *Fruit* the size of a currant, red, turning black. *Seed* ⅙ by ⅛ in., broadly obovoid, the back rounded and with a spathulate tubercle, the margins transversely rugose, face sharply wedge-shaped, light-brown.

75. **V. cantoniensis,** *Seem. Bot. Herald Voy.* 370; whole plant quite glabrous, leaves pinnate or the lower pair of pinnæ ternately compound. Cissus cantoniensis, *Hook. & Arn. Bot. Beech.* 175. C. diversifolia, *Walp. Pl. Meyen.* 314. Hedera hypoglauca, *Hance in Walp. Ann.* ii. 724.

MALACCA, *Griffith*.—DISTRIB. Hongkong.

Stem slender, cylindric. *Leaflets* 5-paired, 2–3 by ½–1 in., ovate-lanceolate, coarsely crenate, whitish beneath. *Tendrils* branched. *Flowers* small, in dichotomous corymbose cymes, 5-merous? *Style* subulate. *Fruit* and *seed* as in *V. rubifolia*.—A specimen in Herb. Hook., marked Khasia, Griffith, is evidently a fragment of the plants collected in Malacca.

DOUBTFUL OR EXCLUDED SPECIES.

CISSUS ACUTIFOLIA, *Poir.; DC. Prodr.* i. 630. Description too short for identification.

C. WALLICHIANA, *Turcz. in Bull. Mosc.* is *Hedera Helix*, L.

VITIS ATROVIRIDIS, *Wall. Cat.* 6040, is *Gymnostemma trigyna*.

V. ERYTHROCLADA, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 301, from Pegu (*Kurz*) is apparently allied to *V. obovata*, but the description is not sufficient for identification.

V. TRICHOPHORA, *Wall. Cat.* 9032, is *Gymnostemma trigyna?*

2. **PTERISANTHES,** Blume.

Large scandent or sarmentose plants furnished with tendrils. *Leaves* alternate, simple or 3–7-foliolate, digitate or pedate. *Flowers* small, 4–5-merous, inserted on a flat expanded membranous pedunculated rachis, unisexual; male flowers marginal, often pedicellate; female sessile. *Calyx* cup-shaped or obsoletely toothed. *Petals* separating. *Ovary* 2-celled; style very short, stigma capitate. *Berry* globose or obovoid, 1–4-seeded.—DISTRIB. Sp. 5 or 6. Malay and Indian archipelago.

Very closely allied to *Vitis*, especially to those forms of the genus in which the flowers are sessile on racemose spikes. Miquel is probably right in uniting it with *Vitis*.

1. **P. polita,** *Miq. Ann. Mus. Lugd. Bat.* i. 95; whole plant quite glabrous, leaves simple.

MARTABAN, at Moulmein, *Lobb*; SINGAPORE, *Maingay*.—DISTRIB. Sumatra, Borneo.

An exceedingly slender far-climbing plant. *Leaves* 4–8 by 2–3½ in., elliptic-oblong or ovate, acute, subcordate, distantly and spinosely serrate or entire, membranous. *Tendrils* bearing the red expanded rachis. *Flowers* 4-merous. *Fruit?*

2. **P. heterantha,** *Griff. Notul.* iv. 694, *under* Embamma; branches leaves and peduncles densely and persistently tomentose, leaves 3-foliolate.

Malacca, *Griffith, Maingay.*

A very slender far-climbing plant. *Leaves* membranous; petiole 4–7 in.; leaflets 5–8 in., on stalks $\frac{3}{4}$–$1\frac{1}{4}$ in., terminal leaflet lanceolate, the two lateral obliquely $\frac{1}{2}$-cordate, serrate, covered above with stiff spreading hairs, beneath with a rust-coloured felted tomentum. *Tendrils* very short, bearing the expanded rachis. *Flowers* 4–6-merous. *Fruit?*—Very nearly allied to Miquel's *V. rufula,* if not identical with it.

3. **P. cissoides,** *Blume Bijd.* 193; leaves 3-foliolate, branches leaves and peduncles covered with a sparse white deciduous flocculent down. *Miquel in Linnæa* xviii. 385, t. viii. Cissus involucrata, *Spreng. Syst.* iv. pt. ii. 44. Embamma cordigera, *Griff. Notul.* iv. 694; *Ic. Pl. Asiat.* t. 646. Vitis pterisantha, *Miq. Ann. Mus. Lugd. Bat.* i. 94.

Malacca, *Griffith, Maingay.*—Distrib. Java.

A slender climber. *Leaves* membranous; petiole $1\frac{1}{2}$–3 in.; leaflets shortly stalked, 3–4 by 2–$2\frac{1}{2}$ in.; terminal obovate, lateral oblique, half cordate-ovate, distantly and spinosely serrate, speedily becoming glabrous above, permanently pubescent on the nerves beneath. *Tendrils* short, bearing the glabrous expanded inflorescence. *Flowers* 4-merous. *Fruit* globose, $\frac{1}{3}$ in. diam., subfleshy, 2-celled, 4-seeded. *Seed* $\frac{1}{4}$ by $\frac{1}{5}$ in., triangular, rounded on the back, and with a sharp ridge beneath.

4. **P. pedata,** *Laws.*; leaves 5-foliolate covered with a sparse white flocculent down.

Malacca, *Griffith, Maingay.*

A slender climber, with glabrous branches. *Leaves* membranous; petiole $1\frac{1}{2}$–2 in.; leaflets very shortly stalked, $2\frac{1}{2}$–3 by 1–$1\frac{1}{2}$ in., oblong-obovate, tipped with a hard bristle, distantly and spinosely serrate, at length nearly glabrous above, nerves beneath covered with a dense rusty tomentum. *Tendrils* short, bearing the glabrous inflorescence. *Flowers* 4-merous. *Fruit?*

3. LEEA, Linn.

Small trees shrubs or herbs. *Branches* striate or sulcate, often herbaceous. *Leaves* alternate, usually very large, simple, or 1–2–3-pinnate; petiole dilated at the base into sheathing stipules. *Peduncles* opposite the leaves. *Tendrils* 0. *Inflorescence* corymbosely-cymose. *Flowers* red, yellow or green. *Calyx* 5-toothed. *Petals* 5, connate at the base and adhering to the staminal tube, revolute. *Stamens* united at the base into a 5-lobed tube, filaments inserted between the lobes of the tube, inflexed; anthers free and exserted, or connate and included in the tube. *Ovary* inserted on the disk, 3–6-celled; style short, stigma swollen; ovules solitary in each cell, erect. *Berry* 3–6-celled, 3–6-seeded, usually succulent, subglobose, flattened at the top. *Seed* wedge-shaped.—Distrib. Species about 25; most abundant in the tropics of Asia and Africa, rare in Australia.

Sect. I. *Leaves* simple.

1. **L. macrophylla,** *Roxb. Fl. Ind.* i. 653; *Wall. Cat.* 6818; *Wight Ic.* 1154; *Dalz. & Gibs. Bomb. Fl.* 41; *Brand. For. Fl.* 102. L. latifolia, *Wall. Cat.* 6821. L. simplicifolia, *Griff. Notul.* iv. 697; *Ic. Pl. Asiat.* 645, f. 1.

Throughout the hotter parts of India, from the Tropical Himalaya, as far west as Kumaon, to Bengal, Assam, Tenasserim? and the Western Peninsula.

Stems erect, flexuose. *Leaves* 9 in.–2 ft., broadly ovate, subcordate at the base, coarsely serrate or dentate or sublobed, repand, glabrous and dark-green above, nearly white beneath, and pubescent with minute branching hairs. *Cymes* puberulous, 1 ft. or more, freely branching. *Flowers* small, white. *Anthers* connected. *Fruit* the size of a small cherry, smooth, black, succulent.—The root is said to yield a colour fit for dyeing.

SECT. II. *Leaves* pinnate (tripinnate leaves may occasionally be found on luxuriant plants).

2. **L. cinerea,** *Laws.;* leaflets 6–9 by 4–5 in. elliptic-ovate serrate-dentate repand dark-green and glabrous above pale beneath with minute branching hairs membranous. ? L. macrophylla, *DC. Prodr.* i. 635.

WESTERN PENINSULA; at Paulgautcherry (in Malabar ?) *Wight.*

Stems herbaceous. *Leaves* about 2 ft.; the lower leaflets on stalks 2–3 in., the upper ones sessile. *Cymes* and *Flowers* as in *L. macrophylla. Fruit ?*

3. **L. coriacea,** *Laws.;* leaflets 10 by 4½ in. sessile ovate subcordate at the base serrate-dentate not repand green and glabrous above rather paler beneath and pubescent with minute nearly simple hairs coriaceous.

WESTERN PENINSULA; the Concan, *Stocks.*

Stems herbaceous. *Leaves* about 2 ft. *Flowers ? Fruiting-cymes* large and fleshy, branching freely. *Fruit* the size of a large currant, dry.—I have seen only a single specimen.

4. **L. alata,** *Edgeworth in Trans. Linn. Soc.* xx. 36; leaflets 12–14 by 2½–3 in. sessile oblong or oblong-lanceolate sharply and irregularly serrate quite glabrous on both sides shining beneath reddish. *Brand. For. Fl.* 102. L. rubra, *Royle Ill.* 145, *not of Blume.*

TROPICAL HIMALAYA; from Garwhal, *Falconer,* to Sikkim, alt. 1–5000 ft., *J. D. H.*

Stems herbaceous. *Leaves* shortly petioled; petiole winged, reddish. *Flowers* red. *Anthers* connate. *Fruit* the size of a large currant, reddish-purple, succulent.

5. **L. angustifolia,** *Laws.;* leaflets 1–1½ ft. by ¾–1 in. on stalks ¼ in. linear-subulate acuminate subcordate at the base distantly serrate glabrous on both sides.

PEGU, at Rangoon, *M'Lelland.*

Stems herbaceous. *Leaves* shortly petioled, about 2½ ft., pale glaucous-green. *Flowers ? Fruiting-cymes* rather small though freely branching. *Fruit* the size of a pea, dry.—Very closely allied to *V. parallela.*

6. **L. crispa,** *Willd. Sp. Pl.* i. 1177; stems branches peduncles and petioles with crisped wings, leaflets shortly stalked 4–12 by 1½–3½ in. oblong-lanceolate or ovate-oblong acuminate or acute rounded at the base deeply and acutely serrate prominently penninerved, glabrous above minutely pubescent on the nerves beneath coriaceous, nerves parallel straight one running to each serrature. *Roxb. Fl. Ind.* i. 654; *Wall. Cat.* 6827; *DC. Prodr.* i. 635. L. pinnata, *Andr. Bot. Rep.* v. 355.

SIKKIM HIMALAYA and the KHASIA MTS., alt. 1–4000 ft.; SILHET, *Wallich.* ASSAM, CHITTAGONG. The CONCAN, *Law.*

Stems herbaceous or somewhat woody, jointed, 4–5 ft. *Leaves* usually quinate-pinnate. *Cymes* stoutish, small; bracts minute. *Anthers* distinct. *Fruit* the size of a cherry, black, succulent.—The crisped winged stems and petioles give to this plant a most elegant appearance.

7. **L. aspera,** *Wall. in Roxb. Fl. Ind. ed. Carey,* ii. 468; leaflets on long stalks 3–6 by 2–3 in. cordate-ovate suddenly acuminate crenate-

serrate prominently penninerved scabrous on both sides and with scattered white appressed hairs between the nerves above, nerves parallel straight one running to every other serrature. *Edgeworth in Trans. Linn. Soc.* xx. 36; *Brandis For. Fl.* 102. ? L. herbacea, *Wall. Cat.* 6829, and 6824 E & G (*in part*) under L. staphylea.

Western Tropical Himalaya, from Jamu to Nipal, ascending to 6000 ft.; Oudh, Khandeish. Western Peninsula, *Wight;* the Concan, *Law?*

Stems herbaceous, erect, 2–4 ft., pubescent, not crisped. *Leaves* membranous or subcoriaceous when old. *Cymes* small, pubescent. *Anthers* distinct. *Fruit* the size of a large currant, black, succulent.—Nearly allied to *L. crispa,* from which it may be always readily distinguished by the want of the crisped wings on the stems and petioles, and by the white appressed hairs on the intercostal spaces. *L. aspera,* Wall. Cat. 6825, belongs to *L. robusta,* but the specimens in Wall. Herb. under 6824 *e* and *g* in part are the true plant.

8. **L. pumila,** *Kurz in Journ. As. Soc. Beng.* 1872, ii. 302; stems and rachis not winged, leaves abruptly or imparipinnate 4–5-foliolate, leaflets 4 in. unequal subfalcate oblong-lanceolate entire puberulous on both sides especially beneath chartaceous.

Tenasserim, *Kurz.*

A small perennial herb, covered with a dense fulvous or cinereous pubescence. *Rachis* and *cymes* ferruginously tomentose. *Flowers* small, in axillary branching subpaniculate cymes, shorter than the leaves. *Sepals* ciliate and usually thinly hirsute. *Petals* broadly oblong, ciliate. *Squamæ* bifid woolly within.—The above description is taken from Kurz. I have seen no specimen. It would appear to be allied to *L. trifoliata.*

9. **L. trifoliata,** *Laws.;* young parts very slightly pubescent otherwise glabrous, leaves 3-foliolate leaflets shortly stalked 2–8 by $\frac{3}{4}$–3 in. elliptic subacuminate sharply serrate very thin and membranous, nerves slightly arcuate one running to every other serrature.

Assam, *Jenkins,* &c.; Bhotan, *Booth;* Mishmi hills, *Griffith.*

A small rather wiry plant, 1–2 ft. *Cymes* small. *Anthers* distinct. *Fruit* the size of a currant, black, dry.—Closely allied to *L. aspera,* but wanting the white hairs on the intercostal spaces, and differing apparently greatly in habit.

Sect. III. *Leaves* 2–3-pinnate (pinnate leaves may be occasionally found in young or starved plants).

* *Leaves glabrous.*

10. **L. parallela;** leaflets 6–10 by 1–2 in. very shortly stalked lanceolate or oblong-lanceolate sharply serrate drying a pale glaucous-green.

Assam, *Jenkins;* Birma, *Roxburgh.*

Shrubby? whole plant quite glabrous. *Leaves* pinnate or bipinnate, 2–3 ft., subcoriaceous. *Flowers* small, glabrous; peduncles long. *Cymes* freely branching. *Anthers* connate. *Fruit* the size of a pea, dry.—Very closely allied to *L. angustifolia,* differing only in the shorter broader and more sharply toothed leaves, and larger cymes.

11. **L. sambucina,** *Willd. Sp. Pl.* i. 1177; leaflets 2–10 by $\frac{3}{4}$–$4\frac{1}{2}$ in. narrowly-lanceolate to ovate-oblong or oblong acute or acuminate serrate shining drying black. *Roxb. Fl. Ind.* i. 657; *Wall Cat.* 6823; *DC. Prodr.* i. 635; *Griff. Notul.* iv. 698; *Ic. Pl. Asiat.* 644, t. i.; *Brand. For. Fl.* 102. L. æquata, *Wall. Cat.* 6824 *d* (*not of DC.*). L. acuminata, *Wall. Cat.* 6830. L. gigantea, *Griff. Notul.* iv. 697. L. læta, *Wall. Cat.* 6831; *Kurz in Journ. As. Soc. Beng.* 1873, ii. 65. L. ottilis, *DC. Prodr.* i. 636. L. ? var. sanguinea, *Wall. Cat.* 6824 M.; *Kurz in Journ. As. Soc. Beng.* 1873, ii. 66.

L. Staphylea, *Roxb. Fl. Ind.* i. 658; *W. & A. Prodr.* 132; *Wall. Cat.* 6824 *except e, and g; Wight Ic.* 78; *Ill.* i. 58; *Dalz. & Gibs. Bomb. Fl.* 41; *Thwaites Enum.* 64. Aquilicia sambucina, *Linn. Mant.* 211; *Cav. Diss.* 7, t. 218. A. ottilis, *Gærtn. Fruct.* i. 275. Gilibertia nalugu, *DC. Prodr.* iv. 256. Gustonia nalugu, *Spreng. Syst.* ii. 440. Ottilis zeyla nica, *Gærtn. Fruct.* i. t. 57. Staphylea indica, *Burm. Fl. Ind.* t. 24, f. 2.—*Rheede Hort. Mal.* ii. 43, t. 26.

Common throughout the hotter parts of INDIA, from the HIMALAYA as far west as Kumaon, to Birma, and southwards to CEYLON and MALACCA.—DISTRIB. Malay Islands, China, Philippine Islands, Australia.

Stems shrubby, with straight branches. *Leaves* pinnate or tripinnate often 3½ by 4 ft.; leaflets stalked, very variable in size and shape; nerves arcuate. *Flowers* greenish-white. *Anthers* connate. *Fruit* the size of a small cherry, dry.—Wight and Arnott discriminate two varieties, depending for their characters upon the texture of their leaves, the size of their flowers, and the nature of the staminal-tubes; but the transitional conditions between them are so numerous that they cannot be maintained. *L. æquata*, DC. Prodr. i. 635, with pubescent stems and leaves, belongs probably to *L. hirta* or *L. robusta.* A specimen of Griffith's, from Assam, with oblong acuminate sharply and finely serrate leaflets and prominent parallel straight nerves, is probably distinct.

** *Leaves pubescent.*

12. **L. integrifolia,** *Roxb. Fl. Ind.* i. 659; leaflets 6–8 by 2–3 in. linear-lanceolate or lanceolate acuminate entire or very slightly serrate glabrous above slightly downy beneath. *W. & A. Prodr.* 132.

WESTERN PENINSULA; moist valleys in the Circars, *Roxburgh.*

Subarboreous. *Leaves* supra-decompound, about 30 in. both ways. *Cymes* supra-decompound, large, subcorymbose. *Corolla-tube* shorter than the calyx. *Staminal-tube* cylindric, the grooves running almost to the line of union with the corolla. *Lobes* emarginate. *Anthers* oblong, pointed, connate.—I have seen no specimen, neither had Wight and Arnott, whose emended description of Roxburgh I follow.

13. **L. robusta,** *Roxb. Fl. Ind.* i. 655; leaflets 6–12 by 2½–6 in. ovate or ovate-lanceolate cuspidate serrate glabrous above pubescent on the veins beneath, cymes compact, bracts large persistent. *W. & A. Prodr.* 132; *Wall. Cat.* 6826. L. aspera, *Wall. Cat.* 6825, *in part.* L. compactiflora, *Kurz in Journ. As. Soc. Beng.* 1873, ii. 65.

SIKKIM HIMALAYA and KHASIA MTS., alt. 1–5000 ft., *H. f. & T.; MARTABAN, Kurz;* WESTERN PENINSULA, in the Northern Circars, *Roxburgh.*

A large robust shrub, 5–6 ft. *Stems* stout, the older parts glabrous, the younger covered with a harsh coarse short pubescence. *Leaves* 1–3 ft. long, often broader. *Bracts* ½–1 in., lanceolate. *Flowers* larger than in the other species. *Anthers* connate. *Fruit* black, succulent, the size of a small cherry.—Although Roxburgh describes the cymes as supra-decompound and the bracts as linear and caducous, I believe that this is the species he intended.

14. **L. diffusa,** *Laws.;* young parts covered with a short thin pubescence, leaflets 5–12 by 2–5 in. shortly stalked acuminate serrate dark-green above with a few white appressed hairs of the intercostal spaces at length glabrous paler and pubescent on the nerves beneath, cymes very large and diffuse, bracts minute caducous. L. aspera, *Wall. Cat.* 6825, *in part.*

NIPAL, *Wallich.* KHASIA MTS., alt. 2–3000 ft., *H. f. & T.* TENASSERIM or ANDAMAN ISLANDS, *Helfer.*

A somewhat weak shrub, with more slender branches than in *L. robusta. Leaves* thin and membranous; nerves arched. *Anthers* connate. *Fruit?*—It would seem as though Roxburgh, in his description of the cymes of *L. robusta*, had taken his characters from specimens belonging to this species.

15. **L. hirta,** *Roxb. Fl. Ind.* i. 655; branches and leaves hairy, leaflets 4–12 by 2–4 in. lanceolate or ovate-lanceolate acuminate serrate harsh and scabrous above hairy beneath, cymes very short and compact, bracts inconspicuous. *Wall. Cat.* 6822. L. scabra, *Steud.* ii. 21.

SIKKIM HIMALAYA, ASSAM, SILHET, the KHASIA MTS., EAST BENGAL, CHITTAGONG, PEGU, and the ANDAMAN ISLANDS.—DISTRIB. Java.

Shrubby, with coarse subscabrous branches and petioles. *Veins* arched. *Cymes* 2–5 in., very compact, densely hirsute. *Flowers* large. *Anthers* connate. *Fruit* the size of a currant, black, dry?—Readily known from *L. robusta* by its abundant and harsh pubescence and inconspicuous bracts; and from *L. diffusa* by its very short and compact cymes.

DOUBTFUL AND EXCLUDED SPECIES.

LEEA CORDATA, *Wall. Cat.* 6019, appears to be a *Vitis* near *V. pallida;* the specimen is insufficient. Kurz in Journ. As. Soc. Beng. 1873, pt. 2, 66, refers it doubtfully to a form of *V. Linnæi.*

LEEA ODONTOPHYLLA, *Wall. Cat.* 6820 (leaves only), is probably a *Vitis*, allied to *V. latifolia.*

ORDER XLIV. **SAPINDACEÆ.** (By W. P. Hiern, M.A.)

Trees, shrubs, or rarely stout or wiry herbs. *Leaves* alternate or less commonly opposite, exstipulate or occasionally stipulate, pinnate palmate trifoliolate or simple; leaflets opposite or alternate, entire or dentate, occasionally lobed. *Flowers* mostly polygamo-diœcious and small, usually either irregular or unsymmetrical. *Calyx* mostly 4–5-lobed or -sepalous, often unequally so, imbricate or valvate in the bud. *Petals* free, equal or unequal, usually 4–5 or 0, the fifth sometimes deficient, flat or in one genus cup-shaped, often bearded or squamate at the base within. *Disk* annular or unilateral, rarely in ♂ flowers deficient. *Stamens* 5–10, inserted inside the disk at the base of the ovary or outside or on the disk, sometimes unilateral; anthers 2-celled, basifixed or versatile; filaments often pubescent, almost always free. *Ovary* centric or excentric, entire or lobed or sometimes divided nearly to the base, 1–4-celled; cells 1–2- or rarely more -ovuled. *Style* simple or divided, usually terminal; stigma usually simple. *Ovules* anatropous campylotropous or amphitropous, usually 1 or 2 together, occasionally more, affixed to the axis of the ovary, ascending. *Fruit* capsular or indehiscent, entire or lobed, sometimes winged. *Seeds* globose or compressed, arillate or naked, exalbuminous or in some genera albuminous. *Embryo* usually thick, sometimes plicate or spirally convolute.—DISTRIB. About 400 to 500 species scattered over the whole world, especially abundant within the tropics; 83 occur in Australia; 37 in Tropical Africa; 20 are given by Boissier in the "Flora Orientalis."

TRIBE I. **Sapindeæ.** *Stamens* inserted inside the disk, sometimes unilateral. *Seeds* exalbuminous. *Leaves* exstipulate, alternate or in *Æsculus* opposite.

Flowers irregular. Disk unilateral or very oblique.
  Ovules solitary. Leaves alternate, not digitate.
    Fruit capsular, inflated, globose or pyriform. Leaflets biternate . . . . 1. CARDIOSPERMUM.

Fruit indehiscent, not divided into lobes. Leaves pinnate . 2. Hemigyrosa.
Fruit deeply divided into 3 1-indehiscent lobes. Leaves pinnate or 3–1-foliolate.
Leaves pinnate. Flowers not very small.
Lobes of fruit globose . . . . 3. Dittelasma.
Lobes of fruit oblong . . . . 4. Erioglossum.
Leaves 3- or 1-foliolate. Flowers very small . . . . 5. Allophylus.
Ovules 2 together. Leaves opposite, digitate . . . . 6. Æsculus.
Flowers regular. Disk annular.
Fruit without wide membranous wings.
Ovules solitary. Fruit not inflated.
Petals each forming a turbinate cup . . . . 7. Scyphopetalum.
Petals flat, with or without scales at the base.
Fruit capsular . . . . 8. Cupania.
Fruit indehiscent.
Fruit not deeply lobed.
Sepals widely imbricated.
Lowest pair of leaflets not stipuliform . . . . 9. Lepisanthes.
Lowest pair of leaflets stipuliform . . . . . . 10. Otophora.
Calyx small; lobes valvate or slightly imbricated.
Petals 0. Fruit ovoid . . . . 11. Schleichera.
Petals 5. Fruit globose . . . . 12. Glenniea.
Fruit deeply divided into 3–1 lobes.
Sepals widely imbricated.
Fruit smooth . . . . 13. Sapindus.
Fruit muricated . . . . 14. Xerospermum.
Calyx valvate or slightly imbricated.
Flowers usually panicled and not fascicled; fruit muricated or tubercled or obsoletely so . 15. Nephelium.
Flowers fascicled. Fruit smooth . . . . . . 16. Pometia.
Ovules 2 together. Capsule inflated . . . . 17. Harpullia.
Fruit with 3–2 broad membranous wings . . . . 18. Zollingeria.

Tribe II. **Acerineæ.** *Flowers* regular. *Stamens* inserted on the disk. *Lobes of the fruit* indehiscent. *Seeds* exalbuminous. *Leaves* opposite, exstipulate.

Ovary 2-celled; ovules 2 together. Fruit consisting of a double samara . . . . 19. Acer.
Ovary 1-celled; ovules solitary. Fruit borne on widely bracteated pedicels . . . . 20. Dobinea.

Tribe III. **Dodonæeæ.** *Flowers* regular. *Stamens* inserted outside the disk. *Seeds* exalbuminous. *Leaves* alternate, exstipulate.

21. Dodonæa.

Tribe IV. **Meliantheæ.** *Flowers* irregular. *Stamens* inserted inside the disk. *Seeds* albuminous. *Leaves* alternate, stipulate.

*21. Melianthus.

Tribe V. **Staphyleæ.** *Flowers* regular. *Stamens* inserted outside the disk. *Seeds* albuminous. *Leaves* opposite, stipulate.

Fruit capsular, inflated. Flowers ½ in. long . . . . 22. Staphylea.
Fruit indehiscent, more or less fleshy. Flowers small . . . . 23. Turpinia.

1. **CARDIOSPERMUM,** Linn.

Climbing herbs with wiry stems and branches, alternate exstipulate leaves, biternate coarsely dentate leaflets, axillary racemes, lowest pair of pedicels developed into spiral tendrils, and irregular polygamo-diœcious flowers. *Sepals* 4, concave, the 2 outer ones small. *Petals* 4, in pairs, the 2 greater lateral usually adhering to the sepals each with an emarginate scale above the base, the two smaller inferior remote from the stamens each furnished with a small crested scale. *Disk* unilateral, wavy, almost reduced to 2 round or linear glands opposite the lower petals. *Stamens* 8, excentric; filaments free or connate at base; the 4 nearest to the glands shorter than the rest. *Ovary* 3-celled; style short, trifid; ovules solitary, ascending. *Capsule* 3-celled, 3-valved, inflated, loculicidal; valves membranous, veiny. *Seeds* globose, usually arillate at the base, exalbuminous, testa crustaceous; cotyledons large, transversely conduplicate.—DISTRIB. Several species, mostly occurring in Tropical America and a few in Tropical Africa.

For the morphology of the flower in this genus, see *Griffith Notulæ*, iv. p. 546.

C. Schmiedelia and C. villosa, *Dalz. & Gibs. Bomb. Fl.* 34, are clearly meant to be Schmiedelia villosa, *Roxb.*

1. **C. Halicacabum,** *Linn. Sp. Pl. ed.* i. 366; thinly pubescent or nearly glabrous rather pale, leaflets much acuminate, flowers small. *W. & A. Prodr.* i. 109; *Wall. Cat.* 8030; *Griff. Notul.* iv. 546, *Ic. Pl. Asiat.* iv. t. 599, f. 3; *Stewart Punjab Pl.* 31; *Dalz. & Gibs. Bomb. Fl.* 34; *Wight Ic.* t. 508; *Thwaites Enum.* 54; *Roxb. Fl. Ind.* ii. 292; *Bot. Mag.* t. 1049; *Grah. Cat. Bomb. Pl.* 28; *Boiss. Fl. Orient.* i. 945; *Baker in Oliv. Fl. Trop. Afr.* i. 417, *with syn.*; *Benth. Fl. Austral.* i. 453. C. microcarpum, *H. B. K. Nov. Gen. & Sp. Pl.* v. 104; *Baker l.c.* 418, *with syn.*—*Rheede Hort. Mal.* viii. t. 28; *Rumph. Herb. Amboin.* vi. t. 24, f. 2.

Throughout INDIA, from the N.W. FRONTIER to CEYLON and MALACCA.—DISTRIB. Most tropical and subtropical countries.

Annual or perhaps in some cases perennial. *Branches* slender, furrowed. *Leaves* deltoid or ovate, 1½–3 in.; leaflets deeply cut. *Flowers* white, ⅛ in. *Fruit* ½–1¼ in. wide, broadly pyriform. *Seeds* officinal. *Root* aperient.—The form with smaller obversely deltoid capsule (*C. microcarpum*), being connected with the type by continuous links, does not appear to me to be a distinct species.

2. **C. canescens,** *Wall. Pl. As. Rar.* i. 14, t. 14; pale, softly pubescent, leaflets short, flowers of moderate size. *W. & A. Prodr.* i. 109; *Wight Ic.* t. 74; *Wall. Cat.* 8032; *Baker in Oliv. Fl. Trop. Afr.* i. 418, *with syn.* ? C. ovatum, *Wall. Cat.* 8031. C. pubescens, *Griff. Journ.* 108, *not of Lagasca.*

BIRMA, *Wallich, Griffith.* Western Peninsula, from the Concan and Circars southwards.—DISTRIB. Abyssinia.

Annual. *Branches* 5-furrowed. *Leaves* patent, triangular, 2–3 in. *Flowers* ⅙–¼ in. *Fruit* nearly globose, 1–1¼ in.—*C. ovatum* deviates somewhat from the type in the direction of the previous species.

2. HEMIGYROSA, Blume.

Trees with alternate exstipulate abruptly pinnate pallid leaves, quite entire coriaceous oblong much reticulated leaflets, short pedicels bracteate at the base and crowded polygamo-monœcious irregular flowers on spicate racemes arranged in axillary panicles. *Sepals* 5, erect, concave, the 2 outer ones smaller. *Petals* 4–5, concave, shaggy at the claw, with an entire or bifid or crested and hooded scale inserted at the claw within; the fifth petal equal minute or obsolete. *Disk* unilateral, cushion-shaped. *Stamens* 8 or in ♂ flowers 6–10, ascending, somewhat unilateral, inserted at the base of the ovary within the disk; filaments pilose; anthers not or scarcely exserted. *Ovary* excentric, turbinate-trigonous, 3-celled; stigma trigonous, blunt; ovule solitary. *Fruit* indehiscent, thickly coriaceous fleshy or woody, trigonous or globose, hairy, 3-celled; cells hairy inside. *Seeds* oblong, exalbuminous, exarillate, testa coriaceous; cotyledons fleshy, equal.—DISTRIB. A few species, confined to the tropics of the old world.

The venation of the leaflets is similar to that of the leaves of *Diospyros Embryopteris*, Pers.

1. **H. deficiens,** *Bedd. Fl. Sylv.* t. 231; leaflets 8–14 opposite subopposite or alternate oblong glabrous shining, racemes solitary crowded or panicled axillary or scattered along the boughs shortly tomentose, petals 4–5 crenulate or subentire, scales entire half the length of the petals, bracts ovate small, flowers fascicled. Sapindus? deficiens, *W. & A. Prodr.* i. 111. Anomosanthes deficiens, *Blume Rumph.* iii. 151; *Benth. & Hook. f. Gen. Pl.* i. 402; *Bedd. Fl. Sylv. Anal. Gen.* lxxii.

WESTERN PENINSULA, Courtallam, Cochin, Travancor, Tinnevelley Ghats, and Annamallay hills, alt. 2–5000 ft.

A middle-sized or small tree. *Bark* slightly tinged with red. *Leaves* 1–2 feet long; leaflets 5–9 by $1\frac{1}{4}$–$2\frac{1}{2}$ in. *Inflorescence* 2–24 in. *Flowers* $\frac{1}{6}$–$\frac{1}{4}$ in. *Stamens* 8–10, rarely only 6 in male flowers; 8 in female flowers, according to Beddome. *Fruit* unknown.—No specimens from Ceylon, as stated by *Wight Ill.* i. 141.

2. **H. canescens,** *Thwaites Enum.* 56, 408; leaflets 2–8, mostly opposite elliptic-oblong ovate or lanceolate glabrous shining, racemes simple or panicled axillary or scattered over the branches shortly tomentose, bracteoles mostly subulate, flowers fascicled, petals with short cut scales at base. *Bedd. Fl. Sylv.* t. 151. H. trichocarpa, *Thwaites l.c.*; *Bedd. Anal. Gen.* lxxi. Molinæa canescens, *Roxb. Cor. Pl.* i. 43, t. 60; *Fl. Ind.* ii. 243. Sapindus tetraphylla, *Vahl Symb.* iii. 54; *Wall. Cat.* 8040. S. bijugus, *Wall. Cat.* 8045. Cupania canescens, *Pers. Syn. Pl.* i. 413; *Grah. Cat. Bomb. Pl.* 29; *W. & A. Prodr.* i. 113; *Dalz. & Gibs. Bomb. Fl.* 35. Cupania (sp.) *Wall. Cat.* 9034. Cupania (sp.) 6, *Herb. Ind. Or. H. f. & T.*

TENASSERIM and BIRMA, *Wallich*, *Helfer*; WESTERN PENINSULA, from the Concan southwards; common on the east side of the Madras Presidency. CEYLON, near Kanally.

A shrub or good sized tree, with a trunk of considerable size but not straight. *Bark* cinereous. *Leaves* 5–22 in.; leaflets usually obtuse or emarginate, occasionally acute, $2\frac{1}{2}$–10 by $\frac{3}{4}$–5 in.; petiolules rugose, $\frac{1}{8}$–$\frac{1}{3}$ in. long, slightly fuscous. *Inflorescence* shorter than the leaves. *Flowers* white, $\frac{1}{5}$–$\frac{1}{4}$ in. *Fruit* subglobose or 3-sided, tomentose, $\frac{1}{2}$–1 in. thick, ochre-coloured.—The pulpy mesocarp resembles an aril.

3. **H. longifolia,** *Hiern.*; leaflets 6 opposite or subopposite oblong shortly acuminate acute glabrous shining base obtuse, racemes short solitary crowded or branched axillary or supra-axillary, flowers tomentose, scale of petals short shaggy flat entire or bifid.

MALACCA, *Griffith*, *Maingay*.

Young parts inflorescence and fruit velvety. *Leaves* 2–$2\frac{1}{2}$ ft.; rachis velvety or obsoletely so; leaflets 12–15 by $2\frac{1}{4}$–$3\frac{3}{4}$ in.; petiolules $\frac{2}{5}$–$\frac{4}{5}$ in. obsoletely velvety. *Inflorescence* 2–3 in.; flowers $\frac{1}{2}$ in.; bracteoles subulate, $\frac{1}{8}$–$\frac{1}{6}$ in. *Petals* 5, obovate, oblong. *Fruit* 1 in. long and broad, trigonous, with 3 broad shallow furrows, setose; setæ flexuose, tomentose.

3. DITTELASMA, Hook. f.

A tree. *Leaves* alternate, pinnate, exstipulate, leaflets subopposite or alternate, quite entire. *Panicles* terminal, bracteate. *Flowers* pale, polygamo-monœcious. *Sepals* quincuncial, oblong, rounded at apex, rather unequal. *Petals* 4, erect, oblong, concave, tomentose outside, the place of the fifth vacant; scale as large as the petal, obovate-oblong, densely shaggy-crested incurved and cohering at apex, inserted near the base of the petal and closely applied to its lamina. *Disk* semilunate-annular, much wider towards one side, glabrous. *Stamens* 8, inserted around the base of the ovary, equal; filaments shaggy, slender at the tip; anthers small, shortly exserted. *Ovary* ovoid-globose, glabrous, 3-lobed, 3-celled, contracted at the apex into short erect style, stigma shortly 3-lobed; ovules solitary in the cells of the ovary. *Fruit* 1–3-coccous, 2 segments usually smaller or obsolete, subglobose, rather fleshy, indehiscent. *Seed* globose, exarillate, exalbuminous; testa very thick, bony, embryo curved, cotyledons large unequal incurved; radicle short, incumbent.—DISTRIB. A monotypic genus.

1. **D. Rarak,** *Hook. f. in Benth. & Hook. f. Gen. Pl.* i. 396; leaflets 14–26 usually lanceolate-acuminate delicately veined base oblique shortly petioluled, inflorescence erect ovoid-pyramidal shorter than or about equalling the leaves. Sapindus Rarak, *DC. Prodr.* i. 608; *Blume Rumph.* iii. 93, t. 167. ? S. pinnatus, *Mill. Gard. Dict.* No. 3. S. saponaria, *Lour. Fl. Cochinch.* 238 (*not of Linn.*)—*Rumph. Herb. Amboin.* ii. 134.

MALACCA, *Griffith, Maingay.* (Ceylon, introduced.)—DISTRIB. Cochin-china, Java, Seychelles (introduced).

Trunk rising 50–60 ft., terete, covered with a glabrous tenacious smooth bark. *Leaves* ranging up to 1½ ft., pari- or imparipinnate; petiole not winged; leaflets 2–4½ by ½–1⅓ in., glabrous. *Panicle* 6–14 in., tawny-velvety. *Flowers* ⅕ in., tomentose, white or pale. *Fruit* ¾–1 in.

4. ERIOGLOSSUM, Blume.

Erect trees or shrubs. *Leaves* odd-pinnate, exstipulate, alternate. *Leaflets* opposite or subopposite, entire. *Panicles* terminal, erect, bearing the white irregular polygamo-diœcious flowers on elongated branches. *Sepals* 5, unequal, orbicular, concave, broadly imbricated, the two outer ones smaller. *Petals* 4, unequal, obovate, clawed, the place of the 5th vacant, scale hairy, hooded, with an apical lobed appendage. *Disk* one-sided, lobed. *Stamens* 8, more or less turned to one side, rather unequal; filaments hairy. *Ovary* stipitate, obcordate, 3-lobed, 3-celled; style slender, stigma obscurely 3-lobed; ovules solitary in the cells of the ovary. *Fruit* 1–3-lobed to the base; segments oblong, indehiscent, diverging. *Seeds* oblong, exarillate, exalbuminous, testa membranous; embryo straight; cotyledons thick.—DISTRIB. Species 2, one of which is at present known to occur only in Senegambia.

For the morphology of the flower in this genus, see *Griffith Notul.* iv. 549.

1. **E. edule,** *Blume Bijdr.* 229; *Rumphia* iii. 119, t. 166; leaflets 8–12 elliptic- or ovate-oblong often acuminate shortly pubescent at least on the veins beneath, base usually oblique obtuse shortly petioluled, flowers crowded. *Benth. Fl. Austral.* i. 454. E. rubiginosum, *Brand. For. Fl.* 108. Moulinsia cupanioides, *Cambess in Mém. Mus. Par.* xviii. 27, 40, t. 2. Sapindus rubiginosa, *Roxb. Cor. Pl.* i. 44, t. 62; *Fl. Ind.* ii. 282; *W. & A. Prodr.* i. 112; *Grah. Cat. Bomb. Pl.* 29; *Wall. Cat.* 8041; *Griff. Notul.* iv. 548; *Dalz. & Gibs. Bomb. Fl. Suppl.* 14; *Bedd. Fl. Sylv. Anal. Gen.* lxxiii. S. fraxinifolius, *DC. Prodr.* i. 608. S. edulis, *Blume Cat. Buitenz.* 64. M. rubiginosa, *G. Don Gen. Syst.* i. 667. S. alternifolius *and* longifolius, *Herb. Hamilt. ex W. & A. l.c.*; *Wall. Cat.* 8041 D, 8046. S. pinnatus, *Roxb. Ic.* 89.

Sikkim Himalaya, Assam, Oudh, Eastern Peninsula, from Birma to Penang and Malacca, Western Peninsula from the Godavery southwards.—Distrib. Widely spread over the Indian Archipelago, and N.W. coast of Australia.

A large timber tree or shrub, with the shoots petioles and inflorescence ferruginous-pubescent. *Leaves* about 1–2 ft.; leaflets 3–15 by 1–3$\frac{1}{2}$ in. *Flowers* sweet-scented, shortly pedicelled in small clusters, on elongated spike-like racemes, arranged in a panicle. *Fruit* $\frac{1}{4}$ in.—Wood useful, strong, and durable, chocolate coloured in the centre. In Linnæus' Herbarium this species is named *Sapindus Saponaria.*

5. **ALLOPHYLUS,** Linn.

Small trees or shrubs. *Leaves* 1- or 3-foliolate, exstipulate, leaflets entire or serrate. *Racemes* simple or branched axillary. *Flowers* small, polygamo-diœcious, globose, shortly pedicelled, white or yellowish. *Sepals*, 4 in opposite pairs, hooded, membranous, widely imbricated; the two outer ones smaller. *Petals* 4, the place of the 5th vacant, small (or obsolete), sometimes declinate, naked inside or usually furnished with a shaggy scale above the claw. *Disk* one-sided, usually with 4 glands opposite the petals. *Stamens* 8, inserted on the receptacle inside the disk. *Ovary* usually 2-lobed and 2-celled; ovules in the cells solitary. *Fruit* indehiscent usually 1–2-lobed; lobes subglobose, fleshy or dry. *Seeds* usually with a short fleshy aril; embryo curved; cotyledons plicate.—Distrib. A large chiefly tropical American genus; about 12 species occur in tropical Africa, others in South Africa, the Mascarine Islands, Madagascar, &c., and several in the Indian Archipelago.

Sect. I. *Leaves* unifoliolate.

1. **A. zeylanicus,** *Linn. Nov. Pl. Gen. in Amoen. Acad.* i. 398 (1747); leaves unifoliolate ovate oblong or obovate more or less acuminate, racemes simple or slightly branched. Schmidelia Allophylus, *DC. Prodr.* i. 611. *Arn. in Act. Acad. Nat. Cur.* xviii. 326; *Thwaites Enum.* 55; *Bedd. Ic. Pl. Ind. Or.* t. 286. S. bidentata, *Wall. Cat.* 8062. Ornitrophe Allophylus, *Pers. Syn. Pl.* i. 412.

Sikkim Himalaya, alt. 1–3000 ft. Assam. Cachar. Ceylon.

A shrub or small tree with terete branches. *Leaves* 1$\frac{1}{2}$–16 by $\frac{1}{2}$–7$\frac{3}{4}$ in.; petioles $\frac{1}{4}$–3 in. *Racemes* $\frac{1}{4}$–9 in. *Flowers* $\frac{1}{16}$–$\frac{1}{8}$ in. diam. *Fruit* globose, red.—A variable species, the principal forms of which may be indicated as follows; intermediate forms exist in some cases.

Var. 1. *acuminata;* glabrous, leaves quite entire ovate, racemes rather long. S. acuminata, *Thwaites Enum.* 55; *Bedd. Ic. Pl. Ind. Or.* t. 287.—Ceylon.

Var. 2. *assamica;* glabrous, leaves quite entire oblong, racemes short.—Assam.

Var. 3. *hispida;* branches midrib and margins of leaf hispid. S. hispida, *Thwaites,* l.c.; *Bedd. Fl. Sylv.* t. 152.—Ceylon.

Var. 4. *varians;* leaves small obovate toothed widely repand denticulate subcoriaceous, racemes rather elongated. S. varians, *Thwaites Enum.* 408; *Bedd. Ic. Pl. Ind. Or.* t. 288.

Var. 5. *Thwaitesii;* leaves 6–10 in. obovate toothed widely repand denticulate or toothed subcoriaceous, racemes short.—Ceylon.

Var. 6. *grandifolia;* leaves obovate toothed or widely repand denticulate, submembranous. Schmidelia, sp. 10, *Herb. Ind. Or. H.f. & T.*—Sikkim, Assam, Cachar.

Sect. II. *Leaves* trifoliolate.

2. **A. Cobbe,** *Blume Rumph.* iii. 131; leaves trifoliolate, leaflets obovate ovate or lanceolate mostly acuminate hairy or glabrous subcoriaceous entire dentate or serrate, racemes simple, flowers irregular, petals sometimes declinate. Rhus Cobbe, *Linn. Sp. Pl. ed.* i. 267. Ornitrophe Cobbe,

Willd. Sp. Pl. ii. 322; *Roxb. Fl. Ind.* ii. 268. Usubis triphylla, *Burm. Fl. Ind.* 89, t. 32, f. 1. O. Schmiedelia, *Pers. Syn.* i. 412. Schmidelia Kobbe, *Lamk. Ill.* ii. 443, t. 312, f. 2. S. Cobbe, *DC. Prodr.* i. 610; *W. & A. Prodr.* 109; *Grah. Cat. Bomb. Pl.* 29; *Wight Ill.* i. 141; *Wight Ic.* t. 964_2; *Thwaites Enum.* 55. Toxicodendrum Cobbe, *Gærtn. Fruct.* i. 207, t. 44, f. 5. O. serrata, *Roxb. Cor. Pl.* i. t. 61; *Fl. Ind.* ii. 266. S. serrata, *DC. l.c.*; *Wight Ill.* i. 141; *W. & A. Prodr.* 110; *Benth. Fl. Austral.* i. 455; *Wall. Cat.* 8061 (O. malabarica, *Hb. Madr.*). S. racemosa, *Linn. Mant.* 67; *Wall. Cat.* 8059. O. Aporetica, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 264. Aporetica ternata, *J. R. & G. Forst. Charact. Gen. Pl.* 132, t. 66. O. villosa, *Roxb. Hort. Beng.* 28; *Fl. Ind. l.c.* 265. S. villosa, *Wight Ic.* t. 401; *Thwaites l.c.*; *Wall. Cat.* 8060. S. Rheedii, *Wight Ic.* t. 964; *Spic. Neilgh. Bot.* 33. O. glabra, *Roxb. Hort. Beng.* 28; *Fl. Ind. l.c.* 267. Allophyllus lanatus, *Roxb. Hort. Beng.* 88; *Fl. Ind.* ii. 263. S. distachya, *DC. l.c.* 610. S. Aporetica, *Wall. Cat.* 8058; *Kurz in Journ. As. Soc. Beng.* 1870, ii. 74. S. glabra, *Wall. Cat.* 8057; *Steud. Nom. ed.* 2, ii. 531. Pometia ternata, *G. Forst. Fl. Ins. Austr. Prodr.* 74 (1786). ? S. dentata, *Wall. ex Voigt Hort. Sub. Calc.* 93. Schmidelia (Allophyllus ornitrophioides, *Herb. Roxb.*); *Wall. Cat.* 8055. S. adenophylla, *Wall. Cat.* 8063. S. vestita, *Wall. Cat.* 8066. S. timorensis, *DC. Prodr.* i. 611. S. orientalis, *Sw. Fl. Ind. Occ.* ii. 666. S. ternata, *Cambess. in Mém. Mus. Par.* xviii. 24. O. asiatica, *Hort. ex Steud. Nom. ed.* 2, ii. 230.—*Rheede Hort. Mal.* v. t. 25.

ASSAM, SILHET, BIRMA, and southwards through the EASTERN PENINSULA. WESTERN PENINSULA, from the Concan southwards. CEYLON.—DISTRIB. N. Australia, Indian Archipelago, &c.

A small tree, or on the low lands and near the coast a shrub, sometimes of considerable size with a climbing habit. *Bark* grey or purple, spotted. *Leaves* very variable in size, shape, margin, and surface. *Leaflets* 1–10 by ½–4 in.; terminal petiolules ranging up to 1 in., lateral ones very short. *Inflorescence* 3–9 in.; flowers yellowish or white, clustered, small; pedicels short. *Fruit* red, shining, globose, ¼ in.—The root is said to be astringent; the ripe fruits are eaten by the natives. According to *Wight & Arnott* in their *Prodromus*, Allophyllus ternatus, *Lour. Fl. Cochinch.* 232 (= S. cochinchinensis, *DC. l.c.* 611), and Gemella trifolia, *Lour. l.c.* 649 (= S. Gemella, *Camb. l.c.*) appear to belong to this plant.

An exceedingly variable species, widely spread in India and the Archipelago, and perhaps extending to Africa and America. The following is a rough key to the principal forms, which are, however, connected by various intermediate links:—

Racemes simple, solitary. Petals somewhat declinate.
Leaflets oval or ovate.
Glabrescent or somewhat hairy.
Leaflets crenate-dentate. Bracts short . . . . *racemosus.*
Leaflets serrate-denticulate. Bracts subulate . . . . *serratus.*
Shoots and leaves very hairy . . . . *villosus.*
Leaflets oval-oblong or lanceolate-acuminate.
Leaflets subentire or serrulate. Bracts short . . . . *glaber.*
Leaflets acutely serrate. Bracts long, linear . . . . *Aporetica.*
Racemes simple, 2 together. Petals not declinate, but the place of the fifth petal vacant . . . . *distachys.*
Racemes branched, solitary . . . . *Rheedii.*

EXCLUDED SPECIES OF ALLOPHYLUS (Schmidelia).

ALLOPHYLUS PINNATUS, *Roxb. Ic.* t. 1407, is Otophora fruticosa, *Blume.*
SCHMIDELIA (sp.), *Wall. Cat.* 8056, is probably Walsura villosa, *Wall.*
S. (ORNITROPHE) FŒTIDISSIMA, *Wall. Cat.* 8064. Cfr. Gynocardia.
S. INTEGERRIMA, *Wall. Cat.* 8065, is Evodia Roxburghiana, *Benth.*

6. **ÆSCULUS,** Linn.

Trees and shrubs with scaly buds. *Leaves* opposite, digitate, deciduous, exstipulate; leaflets obovate or oblong, serrate. *Panicles* terminal, thyrsoid. *Flowers* large, polygamous, irregular. *Calyx* tubular or campanulate, 5-cleft or -dentate, deciduous, with unequal imbricated lobes. *Petals* 4–5, unequal, clawed, without scales, imbricated, exceeding the calyx. *Disk* annular or unilateral, lobed or entire. *Stamens* 5–8, usually 7, inserted within the disk, free. *Ovary* sessile, 3-celled. *Style* elongated, slender; stigma simple. *Ovules* 2 in each cell of the ovary, superposed. *Fruit* capsular, 1-3-celled; valves loculicidal, coriaceous; cells 1-seeded. *Seeds* subglobose, exalbuminous, with a broad hilum; testa coriaceous; cotyledons thick, corrugated, conferruminated.—DISTRIB. About 14 species, natives mostly of the temperate parts of Asia and America.

Æ. Hippocastanum, Linn., is said to be indigenous in North India, but it is not now known in the wild state. See *Boiss. Fl. Orient.* i. 497.

1. **Æ.** (Pavia) **indica,** *Colebr. in Wall. Cat.* 1188; leaflets usually 7 acuminate delicately serrate submembranous distinctly petioluled, panicles oblong nearly equalling or exceeding the leaves, flowers secund. *Camb. in Jacq. Voy. Bot.* 31, t. 35; *Bot. Mag.* t. 5117; *Brand. For. Fl.* 103, t. 19; *Royle Ill.* 135; *Stew. Punjab Pl.* 31.

WESTERN HIMALAYA, alt. 4–10,000 ft. from the Indus to Nipal.—DISTRIB. Affghanistan.

A fine tree of 60–70 ft. in height and 10–15 in girth, with glabrous terete branches. *Leaves* glabrous; leaflets unequal, the terminal one 5–9 by 1½–3 in., the lateral ones smaller; common petiole 3–6 in., thickened at the base, sulcate above; petiolules ranging to ⅝ in. *Calyx* tubular, ⅓ in. long, frequently splitting as the flowers open; lobes short, rounded. *Petals* 4, white with red and yellow, the place of the fifth vacant. *Capsule* ovoid or subpyriform, reddish-brown, without spines, rather rough, 1–2 in. long. *Seeds* dark.—The interior of the seeds is eaten in the Himalayas, according to Dr. Royle, in time of famine; cattle habitually eat them. The bark peels off in long strips; the wood is light-coloured and easily worked. The fruit is officinal, being applied externally for rheumatism. The leaves are lopped for winter fodder in the Himalaya.

2. **Æ.** (Pavia) **punduana,** *Wall. Cat.* 1189; leaflets 6–7 acuminate delicately serrate subcoriaceous shortly petioled, panicles narrowly lanceolate nearly equalling the leaves, lower pedicels longer. Æ. asamicus, *Griff. Journ.* 69, 75, 80, 122. P. khassyana, *Voigt Hort. Sub. Calc.* 97.

TROPICAL SIKKIM HIMALAYA, *J. D. H.* KHASIA MTS., ascending to 4000 ft. ASSAM and BIRMA.—DISTRIB. Siam.

A tree with glabrous terete branches. *Leaves* glabrous; leaflets unequal, the terminal one 8–15 by 2¼–5 in., the lateral ones smaller; common petiole 7½–12 in.; petiolule ¼–¾ in. *Calyx* tubular, ¼ in.; lobes short, rounded at apex. *Petals* 4, white and yellow.

7. **SCYPHOPETALUM,** Hiern.

A small tree. *Leaves* alternate exstipulate unequally pinnate; leaflets opposite. *Flowers* panicled, regular, hermaphrodite, 4–6-merous. *Calyx* deeply lobed, hemispherical; lobes ovate, somewhat imbricated in the bud. *Petals* shorter than the calyx, without scales, very shortly clawed, each forming a wide short turbinate somewhat compressed cup, glabrous outside, hirsute inside. *Stamens* 7–6, inserted within the short annular glabrous disk, scarcely exserted, glabrous; filaments subulate-linear, curved near the apex; anthers short, 2-celled, fixed by the base.

Ovary hairy, subsessile, 3-celled, entire; ovules solitary; style obsolete; stigma blunt.—DISTRIB. A monotypic genus peculiar by the cup-shaped petals.

1. **S. ramiflorum,** *Hiern;* leaflets 9 oblong obtuse or subacuminate coriaceous glabrescent base somewhat narrowed shortly petioluled, panicles from the old wood short, pedicels equalling or rather exceeding the flowers.—Sapindacea, *Griff. Journ.* 83.

BIRMA; hilly woods in the Hookhoom valley, *Griffith* (*Kew distrib.* 985).

Branches reddish. *Leaves* 1 ft., pallid in the dry state; petioles 2 in.; leaflets shining above, 4–8 by 1½–2½ in.; petiolules ¼ in., puberulent; lateral veins about 16 on each side of midrib, alternate. *Panicles* 2½–3 in. diam. *Flowers* ⅛ in. wide, shortly pubescent. *Petals* flesh-coloured.

8. **CUPANIA,** Plum.

Trees or tall shrubs. *Leaves* alternate, exstipulate in most cases abruptly pinnate; leaflets entire, subcoriaceous. *Panicles* axillary and subterminal, bracteoled. *Flowers* nearly regular, polygamo-diœcious. *Calyx* 5–4-cleft or sepals 5–4, roundish, concave, nearly valvate or imbricated in 2 rows. *Petals* 5–4 or obsolete, with or without 1–2 bilobed or entire scales at base inside. *Disk* regular or unequally thickened, annular, glabrous, fleshy. *Stamens* 7–10, rarely fewer, inserted within the disk, included or more usually exserted. *Ovary* ovoid obovoid or obcordate, 2–4-celled, more or less pubescent; ovules solitary. *Fruit* capsular, usually loculicidal obcordate or pyriform, 2–4-lobed or -sided and -celled; lobes connate or almost free and divaricate, sometimes compressed. *Seeds* subglobose or oblong, more or less covered with an aril, exalbuminous. *Embryo* thick, curved.—DISTRIB. A rather large tropical genus of both Worlds; 14 of them are endemic in Australia and only 1 in tropical Africa.

SECT. I. *Fruit* widely obcordate or 2–3-lobed.

* *Sepals 5. Lateral veins of leaflets arching, not parallel.*

1. **C. glabrata,** *Kurz in Journ. As. Soc. Beng.* xli. ii. 303 (1872); glabrescent leaflets 4–8 lanceolate or ovate-oblong acuminate subcoriaceous loosely but prominently reticulated base cuneate oblique, panicles racemose or racemes simple, flowers pentamerous, petals shorter than the sepals squamate. Sapindus squamosus, *Roxb. Hort. Beng.* 88; *Fl. Ind.* ii. 282; *Wall. Cat.* 8097. Connaraceæ ?, *Wall. Cat.* 8550.

PEGU and MARTABAN. PENANG, *G. Porter.*—DISTRIB. Malay Archipelago (*Roxb.*).

A tree of 25–30 ft. *Leaves* abruptly pinnate, shortly petioled, quite glabrous and shining; leaflets 4–7 in. *Flowers* white; pedicels 1/12 in. *Outer sepals* 1/12 in. Petals 1/24 in., glabrous outside, densely white-cottony inside. *Ovary* tawny-hairy.

2. **C. pallidula,** *Hiern;* young parts tawny-pubescent, rachis of leaves not winged, leaflets 6–8 alternate or subopposite elliptic- or ovate-oblong thinly coriaceous pallid inconspicuously veined base oblique cuneate, flowers pentamerous, sepals much imbricated, petals with a large hairy scale on each side of base, capsule 2–3-lobed stipitate.

MALACCA, *Griffith, Maingay.*

A small tree. *Branchlets* terete, clothed with a very short tomentum. *Leaves* 6–12 in.; leaflets 2–5 by ⅔–2 in., acuminate; petiolules very short, tumid at base. *Flowers* ⅛ in. wide. *Anthers* small, glabrous, exserted. *Capsule* ½ in., lobes ⅓ in. wide, nearly glabrate.—Nearly related to *C. regularis*, Blume Rumph. iii. 159, from Sumatra and Borneo; but differs from it by generally smaller leaves and a paler colour in the dry state. In Dr. Brandis' herbarium there is a specimen from Salween, Burmah, named *C. regularis*, Blume ; it is of a dusky colour with leaves 6–12 in., leaflets 4 opposite 4–7 by $1\frac{1}{3}$–$2\frac{2}{3}$ in., and inflorescence about 4 in.

3. **C. fuscidula,** *Kurz in Journ. As. Soc. Beng.* xli. ii. 302 (1872) ; puberulent, leaflets 3–6 alternate ovate or oval obtusely subacuminate thinly coriaceous dusky (in the dry state) above with lax not strongly marked nor parallel reticulation base very oblique, panicles many-flowered, scales of the petals bifid or entire not much shorter than the petals.

Tenasserim, *Helfer.*

A tree. *Shoots* shortly pubescent. *Leaves* 5–8 in. ; rachis not winged ; leaflets $1\frac{1}{2}$–$4\frac{1}{2}$ by $\frac{2}{3}$–$1\frac{2}{3}$ in. ; petiolules very short. *Panicles* 3–4 in. long ; flowers $\frac{1}{12}$–$\frac{1}{10}$ in. wide, pentandrous. *Sepals* imbricated. *Anthers* included or not much exserted, glabrous.

4. **C. pleuropteris ?,** *Blume Rumph.* iii. 158 ; rachis of leaves narrowly winged above, leaflets 4–8 opposite or subopposite obovate or narrowly elliptic obtusely acuminate or pointed base obliquely narrowed thinly coriaceous glabrate or puberulent at least beneath, inflorescence shorter than the leaves pedicels about equalling the pubescent pentamerous flowers, sepals unequal, petals larger furnished at the base each with 2 obovate scales, stamens inserted, capsule obcordate 2–3-lobed.

Singapore, *Maingay.* Malacca, *Maingay, Griffith.* Penang, *Wallich.*—Distrib. Borneo, Sumatra.

Young parts shortly tawny-pubescent. *Leaves* rather pallid especially beneath, 4–$8\frac{1}{2}$ in. ; leaflets 1–6 by $\frac{1}{2}$–2 in., subsessile. *Flowers* $\frac{1}{6}$ in. diam. *Calyx* persistent. *Disk* glabrous, fleshy, annular. *Filaments* slender, pilose below. *Style* linear, glabrous. *Fruit* glabrous, stipitate, compressed, $\frac{1}{2}$ in.

Var. α. bijuga, leaflets 4–2 glabrescent dusky.—*Wall. Cat.* 8094.

Var. β. apiculata, leaflets 6–8 shortly pubescent beneath tawny apiculate.

** *Calyx 5-cleft. Lateral veins of leaflets rather straight, subparallel.*

5. **C. adenophylla,** *Planch. mss. in Hb. Kew. ;* rachis of leaves not winged leaflets 4–6 opposite ovate-oblong gradually acuminate thinly coriaceous glabrous or sparingly pubescent shining base obtusely wedge-shaped lateral veins 9–12 subparallel clearly but not stoutly marked beneath usually with small glands in the axils beneath, flowers tetramerous or pentamerous, calyx cleft subvalvate, petals with 2 obovate (or 1 bilobed) shaggy scales at base, filaments exserted pubescent, fruit obcordate or deeply bilobed glabrate. Sapindus adenophyllus, *Wall. Cat.* 8044.

Tenasserim, at Mergui and Moulmein, *Wallich,* &c. Malacca, *Griffith.*

A shrub of 10–12 ft. Young parts and inflorescence ferruginous-pubescent. *Leaves* 8–13 in. ; leaflets 3–9 by $1\frac{1}{4}$–$2\frac{3}{4}$ in. ; petiolules $\frac{1}{6}$–$\frac{1}{4}$ in. *Inflorescence* 3–6 in. *Flowers* $\frac{1}{8}$ in. wide. *Anthers* somewhat hairy. *Style* equalling the ovary. *Fruit* $\frac{1}{2}$–$\frac{2}{3}$ in., very shortly stipitate ; one lobe sometimes abortive.

Sect. II. *Fruit* pyriform, 3–4-sided, not lobed.

* *Petals squamate at base, exceeding the calyx.*

6. **C. acuta,** *Hiern ;* rachis of leaves not winged, leaflets 11–15 alternate or subopposite lanceolate acuminate acute glabrous shining patent shortly petioluled, flowers tawny-pubescent pentamerous, petals exceeding the calyx glabrous furnished at the base with a nearly equal densely ciliated bipartite scale, partitions obovate diverging, stamens 8, filaments hairy exserted subulate below, fruit more or less pubescent tawny pyriform 3–4-sided shortly stipitate. Sapindacea, *Wall. Cat.* 9036.

SINGAPORE, *Wallich.* MALACCA, *Maingay.*

Young parts and inflorescence tawny-pubescent. *Leaves* 6–12 in.; leaflets 2½–4¼ by ⅔–1⅓ in.; petiolules ⅙–⅓ in., dark. *Inflorescence* about as long as the leaves. *Calyx* about ⅓ in. wide, subvalvate. *Disk* fleshy, glabrous, covered with whitish inflorescence. *Ovary* conical, tomentose, not lobed. *Fruit* 1½–2 by ¾–1¼ in., somewhat fleshy, 3–4-valved, the junctions of the valves marked by slightly elevated grooved keels which unite at the apex of the fruit to form a short apiculus.

7. **C. Jackiana,** *Hiern;* shining, leaflets 6 or 8 opposite or subopposite elliptic shortly and obtusely acuminate base obtuse or somewhat cuneate shortly petiolate, fruiting panicles shorter than the leaves, fruit not lobed obovoid-oblong 2- or by abortion 1-celled mucronate-cuspidate base attenuate and shortly stipitate often compressed mostly 1-seeded. Connarus? Jackianus, *Wall. Cat.* 8552.

CAR NICOBAR ISLAND, *Jack.*

Leafy, young parts tawny-puberulent, soon glabrescent. *Upper leaves* 6–12 in.; leaflets 3–6 by 1¼–2½ in.; lateral veins 8–10 on each side, not opposite. *Panicles* near the extremities of the branches; fruiting pedicels ¼–½ in. *Fruit* 1⅓ by ¾ in., glabrous; valves 2, tomentose inside; dissepiment often partly obliterated. *Seed* ellipsoidal, ¾ by ½ in., occupying the upper part of the cell; base arillate.

8. **C. pentapetala,** *W. & A. Prodr.* 113; rachis of leaves not winged leaflets 4–8 subopposite or alternate ovate or oblong subacuminate coriaceous glabrous shining base obtuse lateral veins somewhat arching not robust, flowers pentamerous pubescent in racemes arranged in crowded panicles, calyx cleft subvalvate, petals small with two small glabrous incurved scales at base, filaments exserted pubescent, ovary pubescent 3-celled, style very short, stigma of three recurved lobes, seeds arillate. Schleichera pentapetala, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 275. C. pentaphylla, *Wight Ic.* t. 402. C. Roxburghii, *Wight Ic.* text, n. 402.

SILHET, *Roxburgh,* 1811, *in Hb. Mus. Brit.*

A pretty large tree. *Leaves* 6–12 in.; leaflets 4–8 by 1½–2¼ in.; petiolule ⅛–¼ in. *Inflorescence* about 7 in. *Flowers* ⅛ in. wide, dull yellowish green. *Stamens* 7–8; anthers glabrous. *Disk* pubescent. *Capsule* stipitate, 3-valved, ⅜ in. diam., pyriform, not lobed.

** *Petals wanting or small and esquamate.*

9. **C. Lessertiana,** *Camb. in Mém. Mus. Par.* xviii. 46, t. 3; leaflets 2–6 usually 4 ovate not or obtusely acuminate delicately reticulated base rounded or shortly narrowed, petiolules short, calyx-lobes 5 valvate, petals 0, disk broad glabrous or nearly so 5-crenate, stamens 8 exserted glabrous, capsule globose-pyriform 3-sided glabrous stipitate. *Hassk. Pl. Jav. Rar.* 285. Ratonia Lessertiana, *Benth. & Hook. f. Gen. Pl.* i. 400. C. Mischocarpus, *Steud. Nomencl. Bot.* ed. 2, i. 454. Mischocarpus sundaicus, *Blume Bijdr.* 238; *Rumph.* iii. 167. Molinæa? (*sp.*) *Wall. Cat.* 8092. Schleichera trijuga, *Moritzi Syst. Verz. Zoll.* 22, *ex Hassk. Pl. Jav. Rar.* 285 (*not of Willdenow*).

TENASSERIM; at Mergui, *Griffith.* SOUTH ANDAMAN ISLDS., *Kurz.* MALACCA, *Maingay.*—DISTRIB. Malay Archipelago.

A tree of moderate size, sometimes a shrub; branches terete, glabrous, dark or reddish. *Leaves* 4–12 in.; rachis not winged; leaflets opposite or alternate, 2–8 by 1–2⅔ in., shining. *Inflorescence* 2–6 in.; pedicels ⅒ in., shortly pubescent. *Calyx* scarcely 1/24 in. long by 1/12 in. wide, shortly pubescent. *Filaments* about ⅛ in. *Fruit* ½ in. long, 1-seeded; stipes ⅕ in.

10. **C. sumatrana,** *Miq. Fl. Ind. Bat.* I. ii. 566; rachis of leaves not winged somewhat trigonous above, leaflets 2–10 subalternate or subopposite

oblong or ovate-oblong slightly or scarcely acuminate glabrous thinly coriaceous delicately reticulated lateral veins rarely conspicuous sometimes with axillary glands, flowers pentamerous rarely tetramerous?, calyx cleft, petals small or wanting without scales, filaments exserted pubescent. Mischocarpus sumatranus, *Blume Rumph.* iii. 168. Sapindacea, *Wall. Cat.* 9035, 8108. C. sp. 4, *Herb. Ind. Or. H. f. & T.*

SILHET, *Gomez, H. f. & T.* TENASSERIM, at Moulmein, *Griffith.*—DISTRIB. Sumatra.

A tree of 30–40 ft. or loftier, branched high up. *Branches* as well as the rachis of the leaves reddish. *Leaves* 8–24 in.; leaflets 3½–11 by 1¼–3 in.; petiolules ⅙–⅓ in. *Inflorescence* 6–12 in.; flowers whitish ⅒ in. wide. *Petals* when present minute or not exceeding the calyx, narrow, somewhat pubescent. *Capsule* ⅔–⅚ in., pyriform, marked with 3–4 ribs, constricted at base into a thick trigonous stipes, apiculate, glabrate, red (*Blume, l.c.*).—A specimen from Pegu (*Kurz*) in Hb. Kew., consisting of a leaf 33 in. with 10 leaflets 15–18 by about 3 in., has been named *Ratonia sumatrana* by Kurz in Hb. Kew.

11. **C. Helferi,** *Hiern;* leaflets 4 alternate elliptic-oblong subacuminate glabrous delicately reticulated base obtuse, flowers pentamerous on short patent racemes arranged in racemose pubescent subterminal panicles, calyx cleft subvalvate, petals 0, filaments pubescent, ovary pyriform stipitate pubescent not lobed.

TENASSERIM, or ANDAMAN ISLDS., *Helfer.*

Leaves about 1 ft.; rachis terete; leaflets 5–8 by 2¼–2½ in.; petiolules ¼–⅓ in. *Panicles* exceeding the leaves. *Calyx* ⅛ in. diam.; lobes ovate. *Stamens* 8.

EXCLUDED SPECIES.

C. CANESCENS, *Pers.*, is Hemigyrosa canescens, *Thwaites.*

C. (sp.) 6, *Herb. Ind. Or. H. f. & T.*, is Hemigyrosa canescens, *Thwaites.*

C. (sp.), *Wall. Cat.* 8067 A, is Nephelium Longana, *Camb.*

C. (sp.), *Wall. Cat.* 8067 B, is perhaps Aglaia edulis, *A. Gr.*

C. (sp.), *Wall. Cat.* 8069, is Chisocheton paniculatus, *Hiern.*

C. (sp.), *Wall. Cat.* 9034, is Hemigyrosa canescens, *Thwaites.*

9. LEPISANTHES, Blume.

Trees or shrubs. *Leaves* pinnate, exstipulate, alternate; leaflets entire, subopposite. *Inflorescence* axillary and lateral, spike-like. *Flowers* regular, polygamo-diœcious. *Sepals* 5–4 widely imbricated in two rows. *Petals* 5–4, equal, furnished at the base with a short wide inflected entire scale. *Disk* annular, regular. *Stamens* 8, erect, inserted within the disk. *Ovary* sessile, 3-sided, 3-celled; ovules solitary; style simple; stigma blunt. *Fruit* drupaceous, 3-celled, 3-sided, not lobed. *Seeds* solitary, erect, exalbuminous; cotyledons very thick, unequal.—DISTRIB. Species few, all except the following confined to the Indian Archipelago.

1. **L. montana,** *Blume Bijdr.* 238; *Rumph.* iii. 151; leaflets 8–10 subopposite elliptic- or ovate-oblong subacuminate base very shortly petioluled subcordate, racemes subfascicled axillary lateral simple or branched.

BIRMA; hills between Sitang and Beeling, *Brandis.*—DISTRIB. Java.

A tree with dark smooth bark. *Leaves* 1½–2 ft., paripinnate; leaflets 5–10 by 2–3 in., glabrous above, glabrate or pubescent beneath along the midrib. *Inflorescence* 2–10 in., shortly pubescent. *Calyx* ⅙ in.; petals rather longer, long-clawed. *Fruit* hairy.—A fruiting panicle from Pegu, about 18 in. long, without leaves in the Hb. Kew, named by Kurz *L. montana*, Bl., has fruits nearly 1 in. long.

2. **L. cuneata,** *Hiern;* leaflets 6–8 opposite or subopposite elliptic-oblong shortly and obtusely acuminate glabrous base cuneate, racemes short supra-axillary, flowers very small obsoletely tomentose.

PENANG, *Porter.*

Nearly glabrous in all parts. *Branches* smooth. *Leaves* 12–18 in.; leaflets 3–8 by $1\frac{1}{4}$–$2\frac{1}{2}$ in.; petiolules $\frac{1}{5}$–$\frac{1}{4}$ in. *Inflorescence* 1–$1\frac{1}{2}$ in.; flowers $\frac{1}{12}$ in.; bracts subulate, small. *Petals* 5, glabrous, with a minute scale at base.

3. **L. Browniana,** *Hiern;* leaflets 6–11 alternate or sometimes opposite elliptic-oblong much acuminate glabrous base cuneate petioluled, racemes short dense axillary puberulent, flowers of moderate size. Sapindacea?, *R. Br. in Wall. Cat.* 7497, *and in Misc. Bot.* ii. 537.

MARTABAN; Tavoy and Keloben, *W. Gomez.*

A small tree with smooth terete branches tinged with red. *Leaves* $1\frac{1}{2}$–$2\frac{1}{2}$ ft., tending to develope further leaflets at the apex; petiole 6–12 in.; leaflets 3–9 by $1\frac{1}{2}$–$2\frac{1}{2}$ in.; petiolules somewhat thickened at the base, ranging up to $\frac{1}{2}$ in. *Inflorescence* 1–2 in.; pedicels about $\frac{1}{4}$ in. *Flowers* $\frac{1}{3}$ in. *Sepals* concave, glabrous inside, thickened at the base; the 2 outer short, the inner $\frac{1}{4}$ in. *Petals* obovate, pubescent at the claw outside, with 2 glabrous scales inside. *Disk* glabrous. *Stamens* 8, $\frac{1}{5}$ in.; filaments hairy. *Ovary* obsolete from the male flowers.

10. OTOPHORA, Blume.

Trees or shrubs. *Leaves* alternate, pinnate; leaflets entire (the lowest pair stipuliform). *Inflorescence* axillary and terminal. *Flowers* regular, polygamous. *Sepals* rarely 4, concave, widely imbricated. *Petals* 5, rarely 4 small, somewhat squamate at base by inflexion of the subauriculate base. *Disk* complete, annular, crenulate or entire. *Stamens* 8–9, rarely fewer, inserted within the disk; filaments very short; anthers oblong, included. *Ovary* 3–4-sided, 3–4-celled; ovules solitary, ascending; stigma subsessile, obtuse, obsoletely 3–4-rayed. *Fruit* baccate, not lobed, indehiscent, 3–4- or by abortion 2–1-celled; seeds arillate; embryo straight; cotyledons thick.—DISTRIB. Species about 8 confined to the Malay Peninsula and Archipelago.

O. fruticosa, *Blume* (=Sapindus fruticosus, *Roxb.; Wall. Cat.* 8043; Allophylus pinnatus, *Roxb. Ic.* t. 1407), has been introduced into India from the Moluccas.

1. **O. paucijuga,** *Hiern;* leaflets 2 or 4 opposite narrowly elliptic obtusely acuminate shining base cuneate, panicles racemose lax elongated, sepals 4–5 minutely ciliate, petals 4–3 scarcely bisquamate at base, stamens 5–7, disk glabrous, ovary glabrous.

MALACCA, *Maingay.*

Leaves 4–10 in.; petioles $\frac{3}{4}$–$2\frac{1}{2}$ in., base thickened and probably bearing caducous stipular leaflets; leaflets 3–6 by 1–2 in.; petiolules $\frac{1}{8}$–$\frac{1}{3}$ in. *Racemes* $\frac{1}{2}$–1 ft.; pedicels about equalling the flowers.

2. **O. erythrocalyx,** *Hiern;* glabrous, leaflets 14–19 opposite or alternate elliptic or oblong shining firmly coriaceous shortly acuminate, base more or less narrowed, lowest pair stipuliform smaller, panicles elongated much branched nearly equalling the leaves, pedicels slender, petals 5 shortly ciliate very shortly squamate at base, stamens 8, filaments fleshy hairy, anthers somewhat hairy pointed, disk glabrous, ovary 3-sided 3-celled glabrous.

MALACCA, *Maingay.*

A small tree. *Leaves* 30–45 in.; petioles thickened at base; leaflets ranging up to 9 by 3 in.; petiolule $\frac{1}{4}$ in. *Flowers* $\frac{1}{8}$–$\frac{1}{6}$ in. *Sepals* blood-red. *Petals* pale-rose, appressed. *Stigma* sessile broadly trisulcate. *Fruit* whitish, glabrous, subglobose, trigonous, 3-celled, 1½ in. diam. *Seeds* arillate.

11. **SCHLEICHERA,** Willd.

Trees. *Leaves* alternate, exstipulate, pinnate; leaflets opposite (or alternate) quite entire, repand-wavy or slightly serrate, with subparallel lateral veins and delicate inconspicuous reticulation. *Panicles* or *racemes* simple, elongated. *Flowers* small, fascicled, regular, polygamo-diœcious. *Calyx* 4–6-fid, small, cup-shaped; lobes valvate or obscurely imbricated. *Petals* absent. *Disk* complete, glabrous, wavy. *Stamens* 5–8, exserted, inserted within the disk; filaments more or less pubescent; anthers small, glabrous. *Ovary* ovoid, 3–4-celled, narrowed into a rigid style; stigma 3–4-cleft. *Ovules* solitary, erect. *Fruit* dry crustaceo-coriaceous, indehiscent, 1–3-celled. *Seeds* erect, enveloped in a fleshy aril; embryo conduplicate, with unequal connate cotyledons.—Distrib. A small genus of India, the Indian Archipelago, and the Philippine Islands.

Beddome, in his Flora Sylvatica Anal. Gen. p. lxxii., speaks of a new tree found by him on the Golcondah hills, Vizagapatam district, which (he says) will probably turn out to be a species of *Schleichera;* it is a middle-sized tree, all the young parts and the inflorescence pubescent-tomentose, leaves alternate abruptly or unequally pinnate, 8–10 inches long, leaflets 2–3 pair with or without a terminal odd one, ovate or oblong with a longish acumination subentire or distantly and rather inconspicuously serrate, quite glabrous in age except the costa, 3–4 inches long by 1–1½ broad, petiolules ¼–½ in. long, racemes axillary panicled. The flower-buds on the specimen in the Kew Herbarium are so young that their structure cannot be determined; indeed the Natural Order to which the plant ought to be referred is uncertain. It is different from any known Indian species of *Sapindaceæ.*

1. **S. trijuga,** *Willd. Sp. Pl.* iv. 1096; leaflets 4–8 opposite elliptic or elliptic-oblong obtuse or shortly acuminate entire at length coriaceous glabrescent or subvelutinous flat base rounded or obtuse sessile or subsessile, fruit ellipsoidal glabrous apiculate smooth or spinous. *Grah. Cat. Bomb. Pl.* 29; *Dalz. & Gibs. Bomb. Fl.* 35; *Thwaites Enum.* 58; *Bedd. Fl. Sylv.* t. 119; *Brandis Fl. Sylv.* 105, t. 20; *Roxb. Fl. Ind.* ii. 277; *Roth. Nov. Sp.* 385; *W. & A. Prodr.* 114, *not of Moritzi.* S. pubescens, *Roth. l.c.* Melicocca trijuga, *Juss. in Mem. Mus. Par.* iii. 187, t. 8; *DC. Prodr.* i. 615; *Wall. Cat.* 8080. Scytalia trijuga, *Roxb. ex DC. l.c.* Stadmannia trijuga, *Spreng. Syst.* ii. 242. St. pubescens, *Spreng. l.c.* Cussambium spinosum, *Hamilt. in Trans. Werner. Soc.* v. 356. C. glabrum, *Hamilt. l.c.* C. pubescens, *Hamilt. l.c.* 357. Conghas zeylonensis, *Hb. Madr. ex Wall. l.c.* M. pubescens, *DC. l.c.*—*Rumph. Herb. Amboin.* i. t. 57; *Wall. Cat.* 8106.

Dry forests, from the N.W. Himalaya at Sirmor; throughout Central and Southern India, Birma, and Ceylon.—Distrib. Java, Timor.

A large tree, leafing and flowering early in the spring. *Leaves* paripinnate, 8–16 in.; leaflets 1–10 by ⅜–4¼ in.; the lowest pairs the smallest. *Racemes* axillary, often several on short branchlets, 2–4 in. *Flowers* yellowish or green. *Fruit* ¾–1 in. long.—The pulpy subacid aril is edible; the bark is astringent, and, according to Dr. Roxburgh, the natives rub it up with oil and use it to cure the itch. The timber is good.

EXCLUDED SPECIES.

S. pentapetala, *Roxb.*, is Cupania pentapetala, *W. & A.*

S. trijuga, *Moritzi* (*not of Willd.*), is Cupania Lessertiana, *Camb.*

12. GLENNIEA, Hook. f.

A large glabrous much branched leafy tree. *Leaves* alternate, exstipulate, 1–2-jugate; leaflets opposite, entire or wavy-repand, coriaceous. *Flowers* in spicate racemes forming a terminal panicle, regular, polygamous. *Calyx* 5-lobed, valvate. *Petals* minute, broader than long, shortly clawed, concave, hairy. *Stamens* 8; filaments short, subulate; anthers short. *Disk* complete, wide, fleshy, glabrous, and lobed. *Ovary* 3-sided, ovoid, contracted at the base, puberulent, 3-celled, narrowed into a very short style; stigma shortly 3-lobed. *Ovules* solitary. *Fruit* depresso-globose, indehiscent, fleshy, obscurely lobed. *Seeds* subglobose, exalbuminous, exarillate.

1. **G. zeylanica,** *Hook. f. in Benth. & Hook. Gen. Pl.* i. 404 (*ex Thwaites Enum.* 408); leaflets elliptic or oblong shining both ends obtuse, inflorescence shortly pubescent. *Bedd. Fl. Sylv.* t. 153.

CEYLON, ascending to 3–4000 ft.

Leaves 4–7 in.; leaflets $1\frac{1}{2}$–5 by $\frac{3}{4}$–$2\frac{1}{3}$ in.; petiolules tumid, $\frac{1}{6}$–$\frac{1}{4}$ in. *Calyx* $\frac{1}{8}$ in. diam.; lobes ovate, subacute. *Fruit* $\frac{3}{4}$–$1\frac{1}{4}$ in. diam.—Dr. Thwaites l.c. gives two varieties:—

VAR. 1, leaflets 2. Sapindus unijuga, *Thwaites*, l.c. 56.

VAR. 2, leaflets 2–4. Nephelium fuscatum, *Thwaites*, l.c. 58; Euphoria fuscata, *Benth. & Hook. f. Gen. Pl.* i. 406. S. Gleniei, *Thwaites*, *l.c.* 408.

13. SAPINDUS, Plum.

Trees or shrubs. *Leaves* alternate or subverticillate (and then simple), exstipulate, usually paripinnate; leaflets coriaceous, commonly entire. *Inflorescence* terminal or axillary. *Flowers* polygamous, regular. *Sepals* 4–5 widely imbricated in 2 rows. *Petals* 4–5, with or without scales. *Disk* complete, annular, fleshy. *Stamens* usually 8–10, inserted within the disk; filaments usually pilose; anthers versatile. *Ovary* entire or 2–4-lobed, 2–4-celled. *Style* terminal; stigma 2–4-lobed. *Ovules* solitary. *Fruit* fleshy or coriaceous, 1–2-coccous; cocci oblong or globose, indehiscent. *Seeds* with a crustaceous or membranous testa; cotyledons thick; radicle short.—DISTRIB. A rather large genus inhabiting the tropical regions of the whole world.

* *Ovary* hairy.

1. **S. trifoliatus,** *Linn. Sp. Pl. ed.* i. 367; leaves (normally) abruptly pinnate leaflets 6–4 elliptic or oblong acuminate or emarginate glabrous or especially beneath pubescent with short curved or stellate hairs base obtuse, inflorescence terminal panicled pubescent, scale of the petals membranous pilose-ciliate, ovary 3-lobed ferruginous-tomentose. S. laurifolia, *Vahl Symb.* iii. 54; *Dalz. & Gibs. Bomb. Fl.* 34; *Roxb. Fl. Ind.* ii. 278; *W. & A. Prodr.* 111; *Grah. Cat. Bomb. Pl.* 29; *Bedd. Fl. Sylv. Anal. Gen.* lxxiii.; *Brand. For. Fl.* 106; *Wall. Cat.* 8038 (*not of Balb. Hb.*). S. acutus, *Roxb. ex W. & A. l.c.*; *Ic.* t. 1965; *not of Wall. Cat.* 8096. S. emarginata, *Vahl l.c.*; *Roxb. l.c.* 279; *W. & A. l.c.*; *Grah. Cat. Bomb. Pl.* 29; *Bedd. Fl. Sylv.* t. 154; *Brand. l.c.* 107; *Wight Ill.* t. 51; *Wall. Cat.* 8039; *Dalz. & Gibs. Bomb. Fl.* 35. S. abstergens, *Roxb. Ic.* t. 1235.—*Rheede Hort. Mal.* iv. 43, t. 19.

Common about villages in SOUTH INDIA; cultivated in Bengal, where it is a doubtful native.

A handsome tree. *Leaves* 5–12 in.; leaflets $1\frac{1}{2}$–8 by 1–4 in.; petiolules short. *Flowers* $\frac{1}{6}$–$\frac{1}{5}$ in. long, white, hairy. *Sepals* 5, elliptic, obtuse. *Petals* 4–5, narrower and rather longer than the sepals; "scale fringed with a dense mass of long white hairs, more or less attached to the claw and inner surface of the petal, probably free when quite young, sometimes attached along the middle line only and free at the sides, in which case it happens that the two edges of the scale separate from the middle part and appear as lateral appendages" (*Dr. Brandis, l.c.*). *Stamens* 8; anthers apiculate. *Disk* concave, with a raised fleshy hirsute edge. *Fruit* fleshy, 2–3-lobed, ½–¾ in. long, at length glaucescent, saponaceous.—There are two forms of this tree, usually regarded as distinct species, and corresponding to Vahl's names; one with acuminate glabrous leaves, the other with emarginate leaves pubescent beneath. The wood is used for making combs and other small articles.

2. **S. erectus,** *Hiern;* leaves abruptly pinnate leaflets 6–10 subopposite narrowly elliptic acuminate entire glabrous thin base more or less narrowed, panicles terminal shorter than the leaves, flowers pentamerous, petals with an erect bifid or entire shaggy scale, ovary hairy, lobes of fruit ellipsoidal nearly glabrate. Nephelium erectum, *Thwaites Enum.* 57.

CEYLON; in the southern provinces, alt. 3000 ft.

An erect shrub, not or sparingly branched, 6–10 ft. high. *Leaves* pallid, 1–2 ft.; leaflets 4–10 by 1⅝–3½ in.; petiolules ⅛–⅕ in. *Flowers* ⅙ by ⅛ in. *Calyx* shortly and appressedly pubescent outside; sepals rounded. *Petals* shortly exceeding the calyx, oblong-obovate, ciliated at the claw, glabrous and rounded above, involute at the margin; scale glabrous at the back, inserted at the top of the claw, falling rather short of the petals. *Disk* glabrous, fleshy. *Stamens* 8; filaments rather shorter than the petals, pubescent above; anthers glabrous. *Style* very short; stigma minute, 3-lobed. *Fruit* fleshy, yellow, about 1 in. long. *Aril* fleshy.

3. **S. Thwaitesii,** *Hiern;* leaves simple obovate-oblong narrowly acuminate entire glabrous pallid base attenuate, racemes terminal short simple or slightly branched obsoletely tomentose, sepals 5, rounded, petals 5, obovate obtuse upper half patent each furnished at base with an oblong hairy scale more than half the length of the petals, disk glabrous 5-cornered, filaments slender somewhat hairy above shorter than the petals, anthers small, ovary hairy 3-lobed. Nephelium simplicifolium, *Thwaites Enum.* 57.

CEYLON; south of the Island, at no great elevation, rare.

An erect shrub, 6–10 ft. high, sparingly branched. *Leaves* 8–12 by 2¼–4 in.; petioles ½–2 in. *Racemes* 2–4 in. *Flowers* pentamerous, ⅛–⅙ in. *Petals* exceeding the calyx, not clawed. *Stamens* 8.

** *Ovary* glabrous.

† *Anthers short.*

4. **S. Mukorossi,** *Gærtn. Fruct.* i. 342, t. 70, f. 3, *g, h;* leaves pinnate leaflets 10–16 rarely fewer lanceolate-oblong alternate or subopposite acuminate or obtuse glabrous closely not conspicuously veined base oblique obtuse, inflorescence terminal and lateral panicled obsoletely tomentose, petals 5 each with a woolly scale on each side at the top of the claw, ovary 3-cornered glabrous. ? S. abruptus, *Lour. Fl. Coch.* 238.

Cultivated throughout N.W. INDIA and BENGAL. KUMAON. SILHET. ASSAM.—DISTRIB. China, Bonin Islands, Japan.

A handsome tree. *Shoots*, &c., obsoletely tomentose. *Leaves* 6–18 in., crowded near the ends of the branches; leaflets approximated, 2–6 by ⅗–2⅕ in., shortly petioluled. *Flowers* ⅒ in., white or purple, ciliated. *Stamens* 8–10; anthers small, exserted, obtuse. *Disk* glabrous, flat, with 5 elevated radiated lines. *Fruit* fleshy, subglobose, somewhat glaucescent, saponaceous, ¾ in. diam., yellow.—There are two forms of this tree; one with obtuse or shortly and suddenly acuminate leaflets (S. detergens, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 280; *not of Wall. Cat.* 8042; *nor* S. fuscatus, *Hb. Ham.*

ex Wall. l.c.); the other with more lanceolate acuminate leaflets (S. acuminata, *Wall. Cat.* 8035; *Royle Ill.* 139), sometimes, as stated by Dr. Royle, with the rachis of the leaves very narrowly bordered.

†† *Anthers oblong.*

5. **S. attenuatus,** *Wall. Cat.* 8037; leaves pinnate or rarely unifoliolate leaflets usually 8–10 ovate lanceolate elliptic or oblong acuminate glabrous base rounded or cuneate, inflorescence terminal and axillary puberulent or nearly glabrous, petals 4–5 imbricated about equalling the sepals, scale present or obsolete, ovary glabrous. Scytalia rubra, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 272. Nephelium rubrum, *G. Don Gen. Syst.* i. 671; *Wight Ic.* tt. 24, 25. Euphoria verticillata, *Wall. Cat.* 8052 D, E, *not* A, B, C. E. rubra, *Royle Ill.* 138. E. attenuata, *Planch. mss. in Herb. Ind. Or. H.f. & T.* Sapindacea, *Griff. Notul.* iv. 551; *Ic. Pl. Asiat.* t. 599, f. 2; *Itin. Notes* 112, n. 163.

ASSAM, Silhet and the Mishmi Hills, *Wallich, Griffith,* &c.; Sikkim Himalaya, *J. D. H.;* CACHAR *Keenan;* BHOTAN, *Griffith.*

A shrub or tree of moderate size. *Leaves* $\frac{1}{2}$–3 ft.; always attenuate at base when unifoliolate; leaflets alternate or opposite, 2–18 by $\frac{2}{3}$–$4\frac{2}{3}$ in. *Flowers* $\frac{1}{10}$–$\frac{1}{5}$ in., nearly glabrous, red; bud greenish. *Stamens* 6–8, not exserted; anthers yellow, oblong; filaments short or 0. *Ovary* bilobed. *Fruit* 1–2-lobed, ellipsoidal, size of an olive, red or dark purple; aril eaten.—There is a scandent state of this plant.

6. **S. Danura,** *Voigt Hort. Sub. Calc.* 94; leaves simple alternate or at the extremities subverticillate obovate elliptic or oblong narrowed or shortly acuminate at apex glabrous gradually narrowed towards a rounded very shortly petioled base veins slender close not conspicuous, panicles terminal puberulent composed of rather remote diverging compound ramifications, petals 5 each with a very short woolly incurved scale at base, ovary glabrous 2–3-lobed. Scytalia Danura, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 274. Sc. verticillata, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 273. Euphoria verticillata, *Lindl. Bot. Reg.* t. 1059; *Wall. Cat.* 8052 letters A, B, C, not D, E. Dimocarpus verticillata, *Hb. Roxb. ex Wall. l.c.* A. Nephelium verticillatum, *G. Don Gen. Syst.* i. 670. E. Danura, *Wall. Cat.* 8051. Didymococcus Danura, *Blume Rumph.* iii. 103. D. verticillatus, *Blume l.c.*

NORTH WEST INDIA, ROHILCUND, ASSAM, SILHET, BIRMA, CHITTAGONG, and TENASSERIM.

An evergreen shrub or small tree 6–10 ft. high. *Leaves* 4–12 by 1–$5\frac{1}{4}$ in.; petioles $\frac{1}{12}$–$\frac{1}{5}$ in. *Flowers* $\frac{1}{8}$–$\frac{1}{7}$ in., pale yellow tinged with pink. *Stamens* 6–8; anthers oblong obtuse; filaments short. *Disk* glabrous. *Fruit* 3–1-coccous, shortly stipitate, ellipsoidal, $\frac{1}{3}$–$\frac{1}{2}$ in. long, pulpy when ripe, orange-coloured.

7. **S. bifoliolatus,** *Hiern;* leaves bifoliolate leaflets opposite elliptic-oblong glabrous closely and inconspicuously veined both ends obtuse, panicles terminal and axillary puberulent equalling or exceeding the leaves, petals 5 each with a small rounded ciliate scale at the base, ovary glabrous bilobed. Nephelium bifoliolatum, *Thwaites Enum.* 57; *Bedd. Ic. Pl. Ind. Or.* t. 289.

CEYLON; lower Badulu road from Kandy. MADRAS; Kolay Mallay Hills, *Beddome.*

A much-branched tree, 20–30 ft. high. *Leaves* $2\frac{1}{2}$–$7\frac{1}{2}$ in.; leaflets 2–$5\frac{1}{2}$ by $\frac{3}{4}$–$1\frac{2}{3}$ in.; petiolules $\frac{1}{6}$–$\frac{1}{3}$ in. *Flowers* $\frac{1}{8}$ in. *Sepals* rounded, glabrous, shortly ciliated, connate at base. *Petals* rather exceeding the sepals, glabrous, ciliated. *Disk* fleshy, glabrous. *Stamens* usually 7, short; anthers ovate-oblong. *Young fruit* bilobed.—An allied new species from Siam, collected by Sir R. Schomburgk, differs by shorter petioles and less branched inflorescence.

DOUBTFUL AND EXCLUDED SPECIES OF SAPINDUS.

S. ACUTUS, *Wall. Cat.* 8096, *not of Roxb.*, is a species of Engelhardtia.

S. ADENOPHYLLUS, *Wall.*, is Cupania adenophylla, *Planch.*

S. ALTERNIFOLIUS, *Herb. Ham.*, is Erioglossum edule, *Blume.*

S. ANGUSTIFOLIUS, *Wall. ex Voigt Hort. Sub. Calc.* 94, *not of Blume*, from Khasia, is unknown to me.

S BENGHALENSIS, *Roxb.*, is Nephelium Longana, *Camb.*

S. BIJUGUS, *Wall.*, is Hemigyrosa canescens, *Thwaites.*

S. DEFICIENS, *W. & A.*, is Hemigyrosa deficiens, *Bedd.*

S. DETERGENS, *Wall.*, *not of Roxb.*, is Dittelasma Rarak, *Hook. f.*

S. EDULIS, *Ait.*, is Nephelium Lit-chi, *Camb.*

S. EDULIS, *Blume*, is Erioglossum edule, *Blume.*

S. FRAXINIFOLIUS, *DC.*, is Erioglossum edule, *Blume.*

S. FRUTICOSUS, *Roxb.*, is Otophora fruticosa, *Blume.*

S. FUSCATUS, *Herb. Ham.*, is Dittelasma Rarak, *Hook. f.*

S. GLABRATUS, *Wall.*, is Xerospermum Noronhianum, *Blume.*

S. GLENIEI, *Thwaites*, is Glenneia zeylanica, *Hook. f.*

S. INDICA, *Poir. in Lamk. Dict.* vi. 667, from "the Indies," cultivated in the Paris Garden, is very little known; it has virgate glabrous branches and simple or subtrifoliolate linear-lanceolate glabrous reticulated leaves 6–8 by ½–⅔ in. decurrent on the petiole; the flower and fruit are unknown.

S. LEPIDOTUS, *Wall.*, is Aglaia Wallichii, *Hiern.*

S. LONGIFOLIA, *Vahl Symb.* iii. 53, a doubtful native of East India, is said by Roxburgh, *Fl. Ind.* ii. 282, to be a native of the Moluccas.

S. LONGIFOLIUS, *Herb. Ham.*, is Erioglossum edule, *Blume.*

S. MICROCARPUS, *W. & A. Prodr.* 112, is Meliosma Arnottiana, *Bedd.*

S. MOLLIS, *Blume Rumphia* iii. 98 (Dimocarpus Litchi, *Herb. Heyne ex Blume l.c.*) may be S. trifoliatus, *Linn.* (S. laurifolia, *Vahl*).

S MONOGYNA, *Herb. Heyne*, is Nephelium Longana, *Camb.*

S. MULTIJUGUS, *Wall.*, may be Chisocheton paniculatus, *Hiern.*

S. OBOVATUS, *W. & A. Prodr.* 111 (Blighia sapida, *C. Kon.*, the "Akee,"), is Cupania edulis, *Schum. & Thonn.*; it is cultivated in India, having been introduced from Guinea.

S. PINNATUS, *Mill.*, is probably Dittelasma Rarak, *Hook. f.*

S. PINNATUS, *Roxb.*, is Erioglossum edule, *Blume.*

S. POLYPHYLLUS, *Roxb. Hort. Beng.* 29; *Voigt Hort. Sub. Calc.* 94, with glabrous pallid leaves 1½ ft. bearing 14–16 subopposite or alternate obliquely oblong entire or repand leaflets 3–6 by 1–1½ in., and with small greenish-white flowers, is very imperfectly known; it was introduced into the Calcutta Garden from Pegu (Cfr. S. Mukorossi, *Gœrtn.*).

S. RARAK, *DC.*, is Dittelasma Rarak, *Hook. f.*

S. RUBIGINOSA, *Roxb.*, is Erioglossum edule, *Blume.*

S. SAPONARIA, *Herb. Linn.*, *not of Linn. Sp. Pl.*, is Erioglossum edule, *Blume.*

S. SAPONARIA, *Lour.*, is Dittelasma Rarak, *Hook. f.*

S. SQUAMOSUS, *Roxb.*, is Cupania glabrata, *Kurz.*

S. TETRAPHYLLA, *Vahl*, is Hemigyrosa canescens, *Thwaites.*

S. TRAVANCORENSIS, *Wall.*, is Canarium commune, *Linn.*

S. UNDULATUS, *Wall. ex Voigt Hort. Sub. Calc.* 94, is probably Nephelium Longana, *Camb.*

S. UNIJUGUS, *Thwaites*, is Glenniea zeylanica, *Hook. f.*

14. **XEROSPERMUM,** Blume.

A tree. *Leaves* alternate, exstipulate, abruptly pinnate; leaflets opposite, entire. *Racemes* axillary and terminal. *Flowers* regular, polygamo-diœcious. *Sepals* 4–5, imbricated in 2 rows. *Petals* 4–5, equal, spathulate, shorter or but little longer than the sepals, hairy at the margin, without scales. *Stamens* 8–7, included, inserted within the annular glabrous disk; filaments filiform, pubescent; anthers small, glabrous. *Ovary* sessile, didymous, muricated, 2-celled; ovules solitary, ascending. *Style* short, thick; stigma thick, hairy. *Fruit* 1–2-lobed; parts ellipsoidal, diverging, muricated with pyramidal tubercles, indehiscent, glabrous inside. *Seeds* exarillate; testa coriaceous outside, fleshy, pilose, simulating an aril; embryo curved; cotyledons very large, thickly fleshy, superposed.—DISTRIB. A monotypic genus.

1. **X. Noronhianum,** *Blume Rumph.* iii. 100; leaflets 2–5 rarely only 1 elliptic lanceolate or oblong more or less acuminate glabrous closely reticulated base obtuse or cuneate, racemes short simple or branched subfascicled. Euphoria Noronhiana, *Blume Bijdr.* 234 (*as to the fruit*). E. xerocarpa, *Blume Bijdr.* 234. Nephelium Noronhianum, *Camb. in Mém. Mus. Par.* xviii. 30. N. xerocarpum, *Camb. l.c.* Sapindus glabratus, *Wall. Cat.* 8095. Euphoria (sp.), *Wall. Cat.* 8054.—*Wall. Cat.* 8083, 8084.

SILHET, *Wallich*; KHASIA MTS. and TENASSERIM, *Griffith.* MALACCA, SINGAPORE and PENANG, *Griffith*, &c.—DISTRIB. Java.

A tree, 30–45 or more feet high, with terete puberulent shoots. *Leaves* 7–13 in.; leaflets 3½–9 by 1–3¼ in.; petiolules ⅙–⅜ in. *Racemes* 1–4 in. *Flowers* ⅓ in., greenish or yellow. *Fruit* 1 in. or more long, yellow.—The Khasia and Silhet specimens differ from the type by lanceolate and more acuminate leaflets.

15. **NEPHELIUM,** Linn.

Trees or shrubs. *Leaves* alternate, exstipulate, pinnate or rarely simple; leaflets entire or rarely dentate more or less glaucous beneath (the lowest pair in one species simulating stipules). *Inflorescence* terminal and axillary. *Flowers* regular, polygamous. *Calyx* 4–8-lobed usually cup-shaped, subvalvate or somewhat imbricated in bud. *Petals* small, without scales, as many as or fewer in number than the calyx-lobes, or wanting. *Stamens* 5–10, inserted within the fleshy glabrous or pubescent disk; filaments usually pubescent. *Ovary* pubescent, 2–3-lobed, usually verrucose; lobes 1-celled, 1-ovuled. *Style* 2–3-lobed, erect. *Fruit* 1–3-coccous, indehiscent, globose or oblong, echinate tubercled or smooth. *Seeds* globose, included in a pulpy aril.—DISTRIB. A genus not separable from Euphoria (*Juss.*), and with it containing about 30 species, confined to India the Indian Archipelago S. China and Australia; in the last country about 10 species occur.

SECT. I. *Leaves* usually paripinnate; leaflets none stipuliform.

* *Petals wanting. Calyx dentate or half-cleft.*

1. **N. mutabile,** *Blume Rumph.* iii. 104; leaflets 4–8 opposite or subalternate oblong or oblong-elliptic obtusely acuminate entire thinly coriaceous above glabrous shining beneath glaucous marked with somewhat arching lateral veins puberulent-glandular base obtusely narrowed or rarely rounded, racemes simple or branched shortly pubescent, calyx cup-shaped 4–5-fid, petals 0, disk glabrous, stamens 7–8, fruit echinate-muricate with strong rigid setæ. Euphoria Longana, *Blume Bijdr.* 233 (*not of*

Lamk.). N. Griffithianum, *Kurz in Journ. As. Soc. Beng.* 1872, ii. 303. Sapindacea, *Griff. Notul.* iv. 550; *Ic. Pl. Ind. Or.* iv. t. 599, f. i.

AVA, at Bhamo, *Griffith.* SINGAPORE, *Anderson.* MALACCA, *Griffith, Maingay.*—DISTRIB. Java, Borneo.

Leaves 3–18 in.; leaflets 2–7 by $\frac{3}{4}$–$2\frac{1}{4}$ in.; petiolules $\frac{1}{10}$–$\frac{1}{5}$ in. *Flowers* $\frac{1}{10}$–$\frac{1}{8}$ in. wide. *Stamens* exserted; filaments pubescent; anthers small, glabrous. *Fruit* 1–$1\frac{1}{2}$ in. diam., red; setæ subulate, obtuse, glabrous or obsoletely tomentose, $\frac{1}{6}$–$\frac{1}{4}$ in. long.

VAR.? *pallens;* leaflets pallid green and nearly glabrous on both sides base more cuneate, inflorescence denser and more branched, filaments 6–8 slender longer, fruit unknown.—Malacca, *Maingay;* Tenasserim, *Lobb.*

2. **N. lappaceum,** *Linn. Mant.* i. 125; leaflets 2–12 opposite or alternate elliptic obovate or oblong usually obtuse quite entire glabrate base obtusely narrowed, racemes loosely panicled axillary and terminal, calyx 4–6-fid subvalvate, petals 0, ovary 2–3-dymous 2-celled densely hirsute, fruit echinate-muricate. *Gærtn. Fruct.* ii. 272, t. 140, f. 1; *Blume Rumph.* iii. 103; *Lamk. Ill.* t. 764; *Hassk. Pl. Jav. Rar.* 287. Euphoria Nephelium, *DC. Prodr.* i. 612; *Wall. Cat.* 8053 *excl. part of* B. Scytalia Ramboutan, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 271. Dimocarpus crinita, *Lour. Fl. Cochinch.* 234. N. echinatum, *Noronh. in Batav. Genootsch. Verh.* v. 80.

SINGAPORE, *Wallich.* Malacca, *Griffith, Maingay.*—DISTRIB. Malay Archipelago.

A lofty tree. *Leaves* 3–18 in.; leaflets 2–9 by 1–4 in., shining and dark green above, paler and marked with subparallel lateral veins beneath; petiolules $\frac{1}{12}$–$\frac{3}{8}$ in. *Branches of the panicle* spreading; flowers fascicled, pubescent, $\frac{1}{12}$–$\frac{1}{10}$ in. diam. *Calyx* campanulate, at length patent. *Stamens* 5–8, exserted; filaments pubescent, especially towards base. *Style* deeply 2–3-lobed; lobes recurving. *Fruit-lobes* $\frac{1}{2}$–2 in. long, red yellowish orange or nearly black, setæ subulate. *Aril* transparent, milky, fleshy, edible.—Hasskarl gives 15 varieties of this cultivated tree, commonly called *Ramboutan.*

3. **N. glabrum,** *Noronh. in Batav. Genootsch. Verh.* v. 80; leaflets 2–10 opposite or alternate elliptic usually obtuse at both ends sometimes shortly acuminate entire above glabrous and shining beneath glabrate or appressedly pubescent paler, racemes panicled, calyx 5–6-lobed slightly imbricated, petals 0, ovary deeply lobed, fruit tubercled. *Reinwardt in Blume Cat. Buitenz.* 111; *Hassk. Pl. Jav. Rar.* 290. Euphoria glabra, *Blume Bijdr.* 233.

MALACCA, *Griffith, Maingay.*—DISTRIB. Probably Malay Archipelago.

A lofty tree. *Leaves* 6–12 in.; leaflets 3–6 by $1\frac{1}{4}$–$2\frac{1}{2}$ in., marked beneath with subparallel lateral veins; petiolules $\frac{1}{12}$–$\frac{1}{2}$ in. *Branches of the panicles* less patent than in *N. lappaceum;* flowers pubescent, $\frac{1}{12}$–$\frac{1}{10}$ in. diam., fascicled. *Calyx* campanulate at length patent. *Stamens* 5–10, exserted; filaments pilose. *Fruit* globose or ellipsoidal glabrous, 1 in. long or more, from dark red to straw-coloured. *Aril* sweet.—Very like *N. lappaceum,* except the fruit. Hasskarl gives 3 forms of it. Blume in Rumphia, iii. 103, treats this as a remarkable variety of *N. lappaceum,* towards which, he states, there is a transition. A form occurs, probably referable to this species, with a 1-celled ovary and unilateral style.

4. **N. Lit-chi,** *Camb. in Mém. Mus. Par.* xviii. 30; leaflets 2–8 opposite or alternate oblong-lanceolate or ovate acuminate above quite glabrous shining beneath glaucous glabrous or very nearly so, lateral veins obsolete base cuneate, panicle terminal, calyx 4–5-dentate, petals 0, disk glabrous, stamens 6–10 at length exserted, fruit tubercled. *Grah. Cat. Bomb. Pl.* 29; *Dalz. & Gibs. Bomb. Fl. Suppl.* 13; *Wight Ic.* t. 43; *Blume Rumph.* iii. 106. Sapindus edulis, *Ait. Hort. Kew.* ii. 36 (1789); *not of Blume.* Euphoria punicea, *Lamk. Dict.* iii. 573; *Ill.* t. 306. Dimocarpus Lichi,

Lour. Fl. Cochinch. 233. Scytalia chinensis, *Gærtn. Fruct.* i. 197, t. 42, f. 3. Sc. Litchi, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 269. E. Lit-chi, *Juss. Gen.* 248; *Wall. Cat.* 8048 (*part*). N. dimocarpus, *Herb. Ind. Or. H. f. & T.* (N. duriocarpus, *T. Anders. Fl. Behar* 11).—*Sonn. Voy. Ind.* t. 129.

Widely cultivated in India; introduced from S. China.

A fine tree of moderate height, with spreading branches. *Leaves* 3–9 in.; leaflets $1\frac{1}{2}$–6 by $\frac{1}{2}$–$1\frac{3}{4}$ in.; petiolules $\frac{1}{12}$–$\frac{1}{4}$ in. *Inflorescence* tawny-puberulent; flowers greenish-white, $\frac{1}{12}$–$\frac{1}{8}$ in. wide. *Anthers* shorter than the filaments. *Disk* glabrous. *Ovary* 2–3-celled, ferruginous-hairy; style 2–3-lobed, lobes recurved. *Fruit* 2–1-lobed, globose, about 1 in. diam.; pericarp dry, at length brittle; tubercles angular. *Aril* fleshy, whitish, edible.—The Litchi of commerce.

** *Petals present. Calyx usually with deep divisions.*

† Leaflets quite entire.

‡ *Lateral veins of leaflets obsolete.*

5. **N. rubescens,** *Hiern;* leaflets 2–10 opposite or alternate lanceolate or oblong acuminate base obtuse or cuneate both sides glabrous shining lateral veins obsolete reticulation minute, panicles axillary and terminal pubescent, calyx rather deeply 4–5-lobed imbricated in bud, petals 4–5 small hairy, stamens 8–10 exserted, ovary emarginate or didymous, fruit sharply tubercled. Euphoria Lit-chi, *Wall. Cat.* 8048, *letters* G, H *only, not of Juss.*

Martaban and Singapore, *Wallich.* Malacca *Griffith.*

Glabrous and shining except the inflorescence. *Leaves* 6–18 in.; leaflets 2–$7\frac{1}{2}$ by $\frac{1}{2}$–$2\frac{1}{2}$ in., turning somewhat red in drying; petiolules $\frac{1}{6}$–$\frac{1}{3}$ in. *Flowers* $\frac{1}{10}$–$\frac{1}{8}$ in. wide. *Petals* linear-obtuse or ovate-acute. *Disk* glabrous. *Anthers* small; filaments pubescent, shorter in the female flowers. *Fruit-lobes* oblong or ellipsoidal, generally solitary, green or red, $\frac{3}{4}$–1 in. long; setæ tubular, short, compressed.

‡‡ *Lateral veins of leaflets more or less conspicuous.*

6. **N. ? Maingayi,** *Hiern;* leaflets 2 or 4 opposite obovate or elliptic glabrous coriaceous shortly petioluled obtuse base obtusely narrowed lateral veins not much raised, flowers tetramerous, calyx-lobes shortly ciliated otherwise glabrous, petals smaller without scales, stamens 8 included, lobes of capsule usually solitary oblong nearly glabrate.

Malacca, *Maingay.*

Glabrous except ferruginous-puberulent shoots and inflorescence. *Leaves* 4–$10\frac{1}{2}$ in.; rachis not winged; leaflets $2\frac{1}{2}$–$6\frac{1}{2}$ by $1\frac{1}{3}$–$3\frac{1}{3}$ in.; petiolules $\frac{1}{6}$–$\frac{2}{6}$ in. *Inflorescence* ranging up to 8 in.; flowers $\frac{1}{10}$ in. diam., in interrupted globose clusters; bracts ranging up to 1 in. long or more. *Calyx* cleft, lobes imbricated. *Petals* shaggy-tomentose. *Filaments* hairy. *Ovary* hairy. *Fruit* (immature) $\frac{3}{4}$–1 in. long, shortly stipitate.

7. **N. costatum,** *Hiern;* leaflets 4–6 opposite or alternate elliptic or oblong glabrous entire above dark green beneath pale obtuse emarginate or shortly acuminate base obtuse, flowers panicled tomentose, calyx deeply 5-lobed imbricated in bud, petals 5 minute obtuse attenuate towards base, stamens exserted.

Malacca, *Maingay.*

Leaves 6–10 in.; leaflets 3–6 by $1\frac{1}{2}$–$2\frac{1}{4}$ in., marked with subparallel lateral veins beneath; petiolules $\frac{1}{6}$–$\frac{1}{3}$ in. *Panicles* densely flowered, nearly equalling the leaves; flowers $\frac{1}{8}$ in. diam. *Filaments* pilose. *Ovary* pilose.

8. **N. Longana,** *Camb. in Mém. Mus. Par.* xviii. 30; leaflets 4–10 opposite or alternate elliptic ovate oblong or lanceolate usually rather

obtuse at both ends glabrous above subglaucescent glabrous or nearly so marked with lateral veins beneath wavy entire, base oblique, panicles terminal and axillary, calyx deeply 5- rarely 6-lobed somewhat imbricated in bud, petals spathulate about equalling the calyx, disk tomentose, stamens 6–10 included in the female shortly exserted in the male flowers, ovary 2-3-lobed, fruit tubercled. *Bot. Mag.* t. 4096; *W. & A. Prodr.* 113; *Grah. Bomb. Pl.* 29; *Blume Rumph.* iii. 108; *Dalz. & Gibs. Bomb. Fl.* 35; *Thwaites Enum.* 58. N. Mora, *Gardn. ex Thwaites l.c.* N. bengalense, *G. Don Gen. Syst.* i. 570. Scytalia bengalensis, *Roxb. ex G. Don l.c.* Sc. Longan, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 270. Dimocarpus Longan, *Lour. Fl. Cochinch.* 233; *Trans. Hort. Soc.* ii. t. 28. Euphoria Longana, *Lamk. Dict.* iii. 574; *Bot. Reg.* t. 1729; *Bedd. Fl. Sylv.* t. 156; *Wall. Cat.* 8049. Sapindus benghalensis, *Roxb. ex W. & A. l.c.* Dimocarpus undulatus, *Wight ex W. & A. l.c.* E. undulata, *Hb. Heyne ex Wall. l.c.* S. monogyna, *Hb. Heyne l.c.* D. pupilla, *Moon Cat.* 31. N. pupillum, *Wight Ill.* i. 141. Euphoria pupillum, *Steud. Nom. ed.* 2, ii. 192 (under *N. pupillum*). N. hypoleucum, *Kurz in Journ. As. Soc. Beng.* 1871, ii. 50.—Cupania (sp.), *Wall. Cat.* 8067, *letter* A *not* B.

Eastern Bengal. Pegu. Western Peninsula, from the Concan southwards. Ceylon. Often cultivated.—Distrib. Cultivated in the tropics.

A tree of 30–40 ft. *Leaves* 4–18 in.; leaflets 2–12 by $\frac{1}{2}$–2$\frac{1}{2}$ in.; petiolules $\frac{1}{12}$–$\frac{1}{3}$ in. *Inflorescence* puberulent; flowers yellowish-white, $\frac{1}{6}$–$\frac{1}{4}$ in. wide. *Calyx* shortly tomentose on both sides. *Petals* 5 rarely 6, pubescent. *Filaments* pubescent; anthers glabrous, shorter. *Fruit* reddish or purple, globose, $\frac{1}{2}$–$\frac{3}{4}$ in. diam.; tubercles rugose or at length smooth. *Aril* wholesome.

9. **N. malaiense,** *Griff. Notul.* iv. 549; leaflets 6–8 subopposite or alternate elliptic or ovate-oblong shortly acuminate above dark green glabrous beneath ferruginous-pubescent subglaucous marked with transverse somewhat arched lateral veins base rounded, inflorescence terminal panicled glandular pubescent, calyx deeply 5-lobed somewhat imbricated, petals entire obovate shaggy inside, stamens short, fruit tubercled or almost obsoletely so globose.

Malacca, *Griffith, Maingay.*

Young parts glandular-pubescent. *Leaves* $\frac{1}{2}$–1$\frac{1}{2}$ ft.; leaflets 2$\frac{1}{4}$–9$\frac{1}{2}$ by 1–3$\frac{3}{4}$ in.; petiolules very short, $\frac{1}{12}$–$\frac{1}{6}$ in. *Inflorescence* about 1 ft.; bracts lanceolate, obtuse; flowers fascicled, $\frac{1}{8}$ in. diam. *Calyx-lobes* obtuse, about equalling the petals. *Stamens* 8; filaments pubescent; anthers glabrous, shorter than the filaments, scarcely exserted. *Ovary* lobed, hairy, equalling the style; stigma capitate, 2–3-lobed. *Fruit* $\frac{2}{3}$–$\frac{3}{4}$ in. diam.; aril fleshy.

10. **N. eriopetalum,** *Miq. Fl. Ind. Bat. Suppl.* i. 508; leaflets 6–8 opposite or alternate elliptic-oblong or oblong apex rounded emarginate or apiculate base rounded or obtuse entire beneath ferruginous subtomentose with well-defined lateral veins above shining, branches of the panicles spike-like, calyx deeply 5-lobed subvalvate, petals spathulate hairy, filaments pubescent, fruit echinate-muricate.

Malacca, *Maingay.*—Distrib. Sumatra.

Young parts and inflorescence ferruginous-tomentose. *Leaves* 1–1$\frac{1}{2}$ ft.; leaflets 4$\frac{1}{2}$–10 by 1$\frac{1}{2}$–3$\frac{1}{2}$ in.; petiolules $\frac{1}{6}$–$\frac{1}{2}$ in. *Inflorescence* axillary and terminal, shorter than the leaves; flowers $\frac{1}{10}$–$\frac{1}{8}$ wide. *Calyx-lobes* ovate-elliptic, obtuse, tomentose outside, glabrous inside. *Petals* small, often some deficient. *Disk* hairy. *Stamens* 5–8, shortly exserted; anther shortly oblong, not quite glabrous. *Ovary* 2-lobed, hairy. *Cocci of the fruit* compresso-subglobose, 1–1$\frac{1}{2}$ in. diam., bright red; setæ subulate-obtuse, $\frac{1}{3}$ in.

†† Leaflets coarsely serrate.

11. **N. Gardneri,** *Thwaites Enum.* 58; leaflets 4–6 lanceolate coarsely remotely and obtusely serrate subglabrous lower surface glaucous base obliquely cuneate very shortly petioluled, racemes panicled, calyx deeply lobed hoary-tomentellous, petals linear-spathulate acute, fruit smoothly tubercled. Euphoria Gardneri, *Benth. & Hook. f. Gen. Pl.* i. 406; *Bedd. Ic. Pl. Ind. Or.* t. 285.

CEYLON; at Puttam, *Gardner.*

Leaves 3–8 in.; leaflets 2–4 by ½–1½ in. *Inflorescence* about as long as the leaves; flowers ⅛–⅓ in. wide, 5-merous. *Calyx-lobes* ovate, somewhat imbricate in bud, hairy on both sides. *Petals* hairy on both sides, exceeding the calyx. *Disk* hairy. *Stamens* 7–10, short; filaments hairy; anthers small, glabrous. *Ovary* tubercled, hispid, didymous; style rather long. *Fruit* ½ in. long.

SECT. II. *Leaves* paripinnate; leaflets with the lowest pair stipuliform.

12. **N. stipulaceum,** *Bedd. in Trans. Linn. Soc.* xxv. 212; *Ic. Pl. Ind. Or.* t. 103; *Fl. Sylv.* t. 155; leaflets 4–6 opposite or alternate elliptic obtuse glabrous lower surface pale or glaucous with clear slender lateral veins glandular in the axils base cuneate lowest pair opposite small stipuliform, panicles axillary and terminal, calyx hirsute 5–6-partite subvalvate, petals 0, stamens 5–9 short, fruit echinate.

WESTERN PENINSULA; moist forests of Malabar and the Anamallay hills, alt. 2000 ft., rare, *Beddome.*

A handsome tree of middle size, with strong wood. *Leaves* 6–14 in.; leaflets 2½–6 by 1⅕–3 in., lowest pair ½–1 in. long; petiolules short, ranging up to ¼ in. *Panicles* rather shorter than the leaves; flowers about ⅓ in. wide. *Calyx* spreading. *Anthers* small. *Ovary* 2–3-lobed. *Style* 2–3-lobed; lobes recurved, glandular. *Fruit* ellipsoidal, ¾ by ½ in.; setæ subulate obtuse, rather weak, hairy at tip. *Seeds* half covered with the succulent aril.

DOUBTFUL AND EXCLUDED SPECIES.

EUPHORA EXSTIPULATIS, *Griff.*, is Aglaia minutiflora, *Bedd.*

EUPHORIA ATTENUATA, *Planch.*, is Sapindus attenuatus, *Wall.*

E. DANURA, *Wall.*, is Sapindus Danura, *Voigt.*

E. FUSCATA, *Benth. & Hook. f.*, is Glenniea zeylanica, *Hook. f.*

E. LITCHI, *Wall. Cat.* 8048 E *only* (Scytalia glabra, *Hb. Ham.*), is Walsura robusta, *Roxb.*

E. NEPHELIUM, *Wall. Cat.* 8053 *part of* B, is Mallotus subpeltatus, *Muell. Arg.*

E. NORONHIANA, *Blume*, is Xerospermum Noronhianum, *Blume.*

E. RIMOSA, *Royle Ill.* 138, is the same as Nephelium rimosum, *G. Don.*

E. RUBRA, *Royle Ill.* 138, is Sapindus attenuatus, *Wall.*

E. VERTICILLATA, *Lindl.*, is Sapindus Danura, *Voigt.*

E. VERTICILLATA, *Wall. Cat.* 8052 D, E, *only*, is Sapindus attenuatus, *Wall.*

E. XEROCARPA, *Blume*, is Xerospermum Noronhianum, *Blume.*

E. (sp.), *Wall. Cat.* 8054, is Xerospermum Noronhianum, *Blume.*

NEPHELIUM BIFOLIOLATUM, *Thwaites*, is Sapindus bifoliolatus, *Hiern.*

N. ERECTUM, *Thwaites*, is Sapindus erectus, *Hiern.*

N. EXIMIUM, *Thwaites*, is Pometia tomentosa, *Kurz.*

N. FUSCATUM, *Thwaites*, is Glenniea zeylanica, *Hook. f.*

N. NORONHIANUM, *Camb.*, is Xerospermum Noronhianum, *Blume.*

N. RIMOSUM, *G. Don Gen. Syst.* i. 671; *W. & A. Prodr.* 113 (Scytalia rimosa, *Roxb. Hort. Beng.* 29; *Fl. Ind.* ii. 272), from Silhet, is unknown to me.

N. RUBRUM, *G. Don*, is Sapindus attenuatus, *Wall.*

N. SIMPLICIFOLIUM, *Thwaites*, is Sapindus Thwaitesii, *Hiern.*

N. VARIABILE, *Wall. ex Voigt Hort. Sub. Calc.* 95, from Khasia, is unknown to me.

N. VERTICILLATUM, *G. Don*, is Sapindus Danura, *Voigt.*

N. XEROCARPUM, *Camb.*, is Xerospermum Noronhianum, *Blume.*

16. **POMETIA,** J. R. & G. Forst.

Tall trees. *Leaves* alternate, pinnate, leaflets subopposite, entire or serrate (the lowest pair usually stipuliform). *Racemes* simple or panicled, elongated slender. *Flowers* regular, polygamous, fascicled, small, shorter than their pedicels. *Calyx* cup-shaped, 5–4-fid, valvate in bud. *Petals* 5–4, small, usually without scales. *Disk* complete, annular, lobed. *Stamens* 4–8, usually 6–4 inserted within the disk, at length much exserted; anthers small. *Ovary* 2–3-coccous and -celled; ovules solitary. *Style* elongated; stigma obtuse, emarginate. *Fruit* 1–2-coccous; lobes subglobose or ellipsoidal, indehiscent, smooth. *Seeds* exalbuminous, covered with a mucilaginous aril.—DISTRIB. Species few, confined to India, Ceylon, the Indian Archipelago and the Pacific Islands.

1. **P. tomentosa,** *Kurz Andam. Rep. ed.* 2, 34; leaflets 10–26 oblong glabrescent or veins and midrib pubescent or even tomentose usually acuminate base rounded or somewhat cordate lateral veins numerous clearly marked beneath, inflorescence pubescent or glabrescent, flowers 5-4-merous. P. eximia, *Bedd. Fl. Sylv.* t. 157. Irina glabra, *Blume Bijdr.* 230. Eccremanthus eximius, *Thwaites in Hook. Kew Journ.* vii. 272, t. 9. Nephelium eximium, *Thwaites Enum.* 57.—*Rumph. Herb. Amboin.* iii. 31, t. 17.

EASTERN PENINSULA; South Andamans, *Kurz;* MALACCA, *Maingay;* CEYLON, in the Central province, *Thwaites*.—DISTRIB. Malay Archipelago.

A tree ranging up to 60 ft. with terete glabrate branches. *Leaves* 1–3 ft.; leaflets ranging up to 1½ by ⅜ ft., the lower leaflets smaller, the lowest pair very small ¾–1½ in. diam.; lateral veins alternately ending in a tooth; petiolules very short. *Flowers* very small, 5–4-merous, yellowish-green. *Petals* white, short, glabrous or hairy near the apex inside, with or without an adnate hairy scale. *Disk* bright red or orange. *Stamens* 5–4; filaments pubescent at least below. *Fruit* deep red or brown when ripe, glabrous, ellipsoidal or subglobose, 1–2 in. diam. *Seeds* oblong; testa red; aril white, opaque.—Timber useful. For a figure and description of a monstrous leaf of this plant, see a paper by Dr. A. Braun on the subject. This perhaps ought to be united to P. pinnata, *J. R. & G. Forster Char. Gen.* 110, t. 55, a native of Fiji and other South Sea Islands; it differs from the latter by rather more numerous less sessile less cordate and not imbricating leaflets.

VAR. *ferruginea;* young parts inflorescence rachis of leaves and midrib of leaflets ferruginous-tomentose; leaflets not exceeding 7 by 2½ in.

17. **HARPULLIA,** Roxb.

Erect trees. *Leaves* alternate, exstipulate, pinnate; leaflets alternate, entire, acuminate, subglabrous. *Flowers* in racemes or panicles diœcious or polygamous, regular. *Sepals* 4–5, erect, equal, imbricated. *Petals* 4–5, narrowly obovate, exceeding the calyx, sometimes clawed, without either glands or scales, but sometimes with inflected lobes at the base of the lamina. *Stamens* 5–8, elongated, inserted within the obscure disk. *Ovary* tomentose, ellipsoidal or oblong, 2-celled; ovules usually 2 together, superposed. *Style* elongated; stigma linear, usually more or less twisted. *Capsule* coriaceous, inflated, 2-lobed, 2-celled, loculicidally 2-valved; cells 1–2-seeded. *Seeds* subglobose, exalbuminous, usually arillate.—DISTRIB. About 6 tropical Asiatic, Australian and Madagascar species.

1. **H. cupanoides,** *Roxb. Hort. Beng.* 86; *Fl. Ind. ed. Carey*, ii. 442; *ed.* 1832, i. 645; leaflets 6–12 alternate or opposite ovate or elliptic thinly coriaceous lateral nerves neither stout nor approximate base obtuse or cuneate shortly petiolate, panicles lax axillary and subterminal, fruit glabrate or nearly so. *Wall. Cat.* 8078. Streptostigma viridiflorum, *Thwaites in Hook. Kew Journ.* vi. 298, t. 9 (1854). H. imbricata, *Thwaites Enum.* 56; *Bedd. Fl. Sylv.* t. 158. Otonychium imbricatum, *Blume Rumph.* iii. 180 (*fide Thwaites*).

CHITTAGONG, *Roxburgh*. BIRMA, *Griffith*. South ANDAMANS, *Kurz*. WESTERN PENINSULA, from the Concan southwards. CEYLON, in the Central province.—DISTRIB. Sumatra, Java, Borneo.

A tree with straight trunk. *Leaves* 6–18 in.; leaflets 2–9 by 1–3 in.; petiolules $\frac{1}{3}$–$\frac{2}{5}$ in. *Panicles* erect (in flower), 2–9 in. long. *Flowers* pale-yellow or greenish, $\frac{2}{5}$–$\frac{1}{2}$ in. long. *Calyx* $\frac{1}{6}$–$\frac{1}{4}$ in. long, somewhat tomentose, deciduous; partitions obtuse. *Petals* glabrous except the claw, obtuse. *Capsule* 1 by $1\frac{1}{2}$–$2\frac{1}{3}$ in., compressed, pendulous, bright orange.—Some of Blume's species of Harpullia are probably synonymous.

18. **ZOLLINGERIA,** Kurz in Journ. As. Soc. Beng. xli. ii. 303 (1872).

A glabrescent, shining tree. *Leaves* alternate, deciduous, exstipulate; leaflets alternate, entire, papery. *Panicles* axillary and terminal; flowers white, pedicelled. *Calyx* 5-partite; sepals deciduous, unequal, imbricated; the inner 2 larger. *Petals* 5, somewhat clawed, each furnished at the base with an obtuse woolly scale half as long as themselves. *Stamens* 8, inserted within the obsolete disk; filaments not exserted, longer slender; anthers oval, cells blunt. *Ovary* 3-sided, conical, attenuated into the simple 3-dentate 3-sided style, 3-celled; cells 1–2-ovuled. *Capsules* large, papery, usually 1-celled, broadly 3–2-winged, septicidally dehiscent. *Seeds* solitary or 2 together, exalbuminous, without aril; testa membranous; cotyledons large green plicate.—DISTRIB. A monotypic genus.

1. **Z. macrocarpa,** *Kurz l.c.*; leaves glabrous, leaflets 4–5 oblong rather obtusely narrowed scarcely acuminate base oblique, capsule-wings striate rounded at base truncate at apex.

PEGU, at Prome, *Kurz*.

A tree up to 80 ft.; young parts tawny-puberulent. *Leaves* 9–12 in., odd-pinnate or rarely subabruptly pinnate; leaflets 5–8 by $1\frac{1}{2}$–2 in.; lateral veins subparallel; petiolules $\frac{1}{6}$–$\frac{1}{4}$ in. *Panicles* 4–6 in., somewhat drooping, obsoletely puberulent *Pedicels* $\frac{1}{6}$ in. *Sepals* about $\frac{1}{12}$ in. long, obovate, ciliolated, subemarginate. *Petals* $\frac{1}{6}$ in. long, ciliated, oblong, obtuse. *Filaments* pubescent. *Ovary* sparingly pubescent at base. *Capsules* 2–$2\frac{1}{2}$ in. by $1\frac{1}{2}$–$1\frac{3}{4}$ in., oblong, glabrate.

19. **ACER,** Tournef.

Trees with opposite simple or palmately lobed exstipulate leaves, terminal and lateral racemes or corymbs and polygamous regular flowers. *Calyx* usually 5-partite, imbricated, deciduous. *Petals* isomerous with the sepals or 0, erect, shortly clawed, without scales. *Stamens* 4–12, usually 8, inserted on the glabrous disk; filaments usually shorter in the hermaphrodite than in the male flowers. *Ovary* 2- (rarely 3-) lobed and celled, laterally compressed; cells 2-ovuled. *Style* bipartite; divisions linear, stigmatose on the inner face. *Fruit* a double samara, indehiscent. *Seeds* exalbuminous, exarillate; embryo conduplicate.—DISTRIB. A genus of 40–50 species, found also in Europe, other parts of Asia, and in North America.

SECT. I. *Leaves* undivided.

* *Leaves with* 3 *basal nerves.*

1. **A. oblongum,** *Wall. in DC. Prodr.* i. 593; *Cat.* 1222; leaves undivided quite entire oblong or ovate acuminate glabrescent penninerved silvery glaucous beneath base obtuse 3-nerved, cymes panicled contemporary with the leaves pubescent. *Camb. in Jacq. Voy. Bot.* 31, t. 34; *Brand. For. Fl.* 110; *Royle Ill.* 134. A. laurifolium, *D. Don Prodr.* 249. A. Buzimpala, *Hamilt. ex D. Don l.c.*

TEMPERATE HIMALAYA; from Kashmir, alt. 2–3000 ft., to Sikkim, alt. 3–5000 ft.; Bhotan, and the Mishmi hills.—DISTRIB. Hongkong, Lochow Islds.

A tree of 40–50 ft.; trunk 1–2 ft. diam. *Leaves* more or less persistent, dark-green above, 2–7 by $\frac{2}{3}$–3 in., minutely reticulated; petioles $\frac{2}{3}$–3$\frac{1}{2}$ in., usually about half the length of their leaves. *Sepals* and *petals* narrow, $\frac{1}{12}$–$\frac{1}{10}$ in. *Stamens* 8, exserted, glabrous. *Ovary* hairy. *Fruit* glabrous; carpels 1–1$\frac{1}{4}$ in. long; wings venose, diverging, contracted below, back nearly straight; cells woody, angular, clothed inside with white hairs.—Wood reddish, used for agricultural implements, and in Tibet for drinking cups.

VAR.? *microcarpum;* carpels $\frac{1}{2}$–$\frac{5}{8}$ in. long. Mishmi hills, *Griffith.*

2. **A. niveum,** *Blume Cent. Plant. Nov.; Rumph.* iii. 193, t. 167 B, fig. 1; leaves undivided quite entire elliptic or oblong acuminate or caudate glabrescent penninerved white-glaucous beneath base rounded 3-nerved, cymes panicled glabrous contemporary with the leaves. A. laurinum, *Hassk. in Tydschr. Nat. Wetersch.* x. 138 (1843); *Cat. Pl. Hort. Bog.* 222 (*without description in either case*). A. javanicum, *Jungh. in Tydschr. Nat. Wetersch.* viii. 391 (1841), *not of Burmann.*

UPPER ASSAM, *Griffith.* MARTABAN, at Moulmein, *Helfer.*—DISTRIB. Sumatra, Java.

A tree of 100–150 ft. *Leaves* 3–8 by 1–3$\frac{1}{2}$ in.; petioles 1–3 in. *Cymes* lax; flowers yellowish-green. *Sepals* lanceolate or oblong, $\frac{1}{8}$ in. *Petals* equalling or shorter than the sepals. *Stamens* 6–8, glabrous, short, included (in hermaphrodite flowers). *Ovary* hairy. *Fruit* glabrous; carpels $\frac{2}{3}$–2$\frac{1}{2}$ in. long; wings venose, widening upwards, back but little curved, cells not angular.

3. **A. lævigatum,** *Wall. Pl. As. Rar.* ii. 3, t. 104; *Cat.* 1223; leaves undivided quite entire or minutely serrate when young ovate or oblong acuminate glabrous shining penninerved reticulated green on both sides base rounded 3-nerved, cymes panicled glabrous contemporary with the leaves. *Brand. For. Fl.* 110, *non Hort.*

TEMPERATE HIMALAYA; alt. 5–9000 ft., from Simla to Sikkim. KHASIA MTS., alt. 5000 ft.

A large tree; trunk 30–40 ft. high, 3–4 ft. diam. *Leaves* 2$\frac{1}{2}$–6 by 1–2 in., more strongly reticulated than in *A. oblongum;* petioles $\frac{1}{3}$–$\frac{1}{2}$ in. *Cymes* laxer than in *A. oblongum.* *Sepals* 5, ovate or lanceolate, $\frac{1}{15}$ in. *Petals* 5, obtuse, clawed, white, $\frac{1}{12}$–$\frac{1}{8}$ in. *Stamens* 5–8, glabrous, exserted. *Ovary* hairy. *Fruit* glabrous; carpels

1–1¼ in. long; wings venose, slightly diverging, widened above, back usually curved; cells not angular.—Wood used for building.

** *Leaves with* 5 *basal nerves.*

4. **A. sikkimense,** *Miq. in Archives Néerlandaises,* ii. 471; leaves undivided minutely serrate ovate cuspidate subcoriaceous glabrous penninerved both sides green base cordate 5-nerved, racemes spicate contemporary with the leaves glabrate.

EASTERN TEMPERATE HIMALAYA, from Sikkim, alt. 7–9000 ft., and Bhotan, to the Mishmi hills, *Griffith.*

A large tall tree. *Leaves* 3–6 by 1⅔–3⅔ in.; petioles ¾–1⅛ in. *Racemes* equalling or shorter than the leaves; pedicels very short alternate and opposite. *Sepals* lanceolate. *Petals* short. *Stamens* glabrous, short. *Fruit* glabrous; carpels ⅝–¾ in. long; wings venose, diverging, widened above, back straight or slightly curved; cells not angular.

5. **A. Hookeri,** *Miq. in Archives Néerlandaises,* ii. 471; leaves undivided finely duplicato-serrate ovate caudate-acuminate submembranous subglabrate both sides green base 5-nerved cordate, racemes simple nearly equalling and contemporary with the leaves puberulent.

EASTERN TEMPERATE HIMALAYA; Sikkim, alt. 8–10,000 ft., *J. D. H.* BHOTAN, *Griffith.*

A tree of 40–50 ft. *Leaves* 2½–6 by 1¼–3½ in.; petioles 1–2 in. *Racemes* 2–4½ in.; pedicels ⅛–⅗ in. *Flowers* ⅓ in., glabrous. *Sepals* elliptic or ovate. *Petals* obovate, about equalling the sepals. *Stamens* 8, scarcely exserted. *Fruit* glabrous; carpels ¾–⅞ in. long; wings venose, diverging, widened above, back slightly curved; cells not angular.

6. **A. stachyophyllum,** *Hiern;* leaves undivided serrate ovate caudate-acuminate submembranous penninerved upper surface subglabrous lower surface hoary-velvety base rounded or slightly hollowed 5-nerved, racemes simple or branched about equalling the leaves.

EASTERN TEMPERATE HIMALAYA; Sikkim, in the Lachoong valley, alt. 9–10,000 ft., *J. D. H.* BHOTAN, *Griffith.*

A small tree. *Leaves* 2½–3½ by 1⅓–2½ in.; petioles 1–3 in. *Flowers* unknown. *Fruit* glabrous; carpels 1¾–2 in. long; wings venose, somewhat widened upwards and diverging; cells angular, cuneate at base, woody.

SECT. II. *Leaves* 3-lobed.

7. **A. isolobum,** *Kurz in Journ. As. Soc. Beng.* xli. 302, 1872; leaves deeply 3-lobed glabrous shining acutely serrulate base subcordate 3-nerved lobes lanceolate acuminate acute.

PEGU, *Kurz.*

A large glabrous tree. *Leaves* 3–4½ by 3–5 in. wide; petioles 1–2 in. *Flowers* and *fruit* unknown.

8. **A. pentapomicum,** *J. L. Stewart ex Brand. For. Fl.* 111; leaves 3-lobed glabrescent except tufts of hairs in the axils of the 3–5 basal nerves base truncate or cordate lobes ovate obtusely serrate, peduncles fascicled.

NORTH WESTERN TEMPERATE HIMALAYA; in hot dry places from Kashmir to Kumaon, alt. 2300–5300 ft.

A tree; girth of trunk rarely as much as 5½ ft.; twigs grey or reddish. *Leaves* 1½–4 by 2½–6 in., pale on both sides; lobes about half the depth of the leaves; petioles 1¼–4 in., thinly tomentose when young, afterwards glabrate. *Flowers* unknown. *Pe-*

duncles in short little-branched corymbose cymes, which measure 2–3 in. long. *Fruit* glabrous; carpels 1 in. long; wings venose, slightly diverging, widening above, back nearly straight; cells somewhat nodose.

Sect. III. *Leaves* 5-lobed and nerved (3-lobed in *A. villosum* var. *Thomsoni*).

9. **A. cæsium,** *Wall. ex Brand. For. Fl.* 111, t. 21; leaves palmately 5-lobed pale beneath serrate base cordate 5-nerved lobes ovate acuminate basal ones smaller, cymes corymbose appearing after the leaves.

Temperate Western Himalaya, from Kashmir to Nipal, alt. 7–10,000 ft., extending to Kumaon.

A tree, 70–80 ft. high. *Leaves* 3½–7 by 4–8 in., thinly pubescent, especially on the veins beneath, usually glabrescent except in the axils of the 5 (rarely 7) basal nerves; petioles 2½–6½ in. *Cymes* nearly equalling the leaves; flowers pentamerous. *Petals* short, white. *Stamens* short. *Fruit* glabrate; carpels 1¾–2 in. long; wings venose, somewhat diverging, back slightly curved; cells angular, black.—Wood soft; inferior drinking cups are made of it in Tibet.

10. **A. villosum,** *Wall. Pl. As. Rar.* ii. 4; *Cat.* 1227; leaves normally 5-lobed upper surface glabrate lower surface pubescent or nearly glabrate rather paler base cordate 5-nerved lobes ovate or lanceolate serrate or repand, racemes branched or simple pubescent usually appearing rather before the leaves. *Brand. For. Fl.* 111. A. sterculiaceum, *Wall. Pl. As. Rar.* ii. 3, t. 105; *Cat.* 1224.

Temperate Western Himalaya; from Kashmir to Nipal, alt. 7–9000 ft.

A large handsome tree. *Leaves* 3½–10 in. long and wide; petioles 2–5 in. *Cymes* lateral shorter than the leaves. *Sepals* elliptic or ovate, ciliate, 3-nerved. *Petals* linear-oblong, ciliate, about equalling the calyx. *Stamens* 5–8, glabrous, exserted. *Fruit* puberulent, brownish; carpels 1½–2¼ in. long, diverging; wings venose, margins often crenulate, back rather curved; cells angular-nervose.—According to Dr. Wallich his *A. sterculiaceum* differs from the type of *A. villosum* in being much smoother; he thinks, however, that this difference may perhaps be due to its less elevated situation.

Var. Thomsoni, *Miq. in Archives Néerlandaises*, ii. 470 (*sp.*); basal lobes of leaves obsolete, the three other lobes small, fruit 2–3 in. long.—Sikkim Himalaya, alt. 7–9000 ft., *J. D. H.;* Bhotan, *Griffith.*—This is probably A. platanifolia, *Griff. Itin. Notes*, 200, and perhaps distinct from *A. villosum.*

11. **A. caudatum,** *Wall. Pl. As. Rar.* ii. 4, 28, t. 132; *Cat.* 1225; leaves 5-lobed serrate submembranous nearly or quite glabrescent except axils of the 5 basal nerves base cordate or truncate lobes ovate caudate the two basal ones small, racemes short in flower longer in fruit nearly glabrous. *Brand. For. Fl.* 112. A. pectinatum, *Wall. l.c.*; *Cat.* 1226. A. acuminatum, *Wall. ex D. Don Prodr.* 249.

Temperate Himalaya; from Chumba to Sikkim, alt. 7–11,000 ft.

A large tree, with somewhat glaucous shoots. *Leaves* in some cases with persistent puberulence especially along the veins beneath, 2½–5 in. long and wide; petioles 1¼–3½ in., reddish, puberulent. *Cymes* appearing about the time of the leaves. *Sepals* ⅙ in., oblong, obtuse, whitish, 5–4. *Petals* white, obovate, rather shorter than the calyx. *Stamens* 4–6, exserted. *Fruit* glabrous, subglaucous; carpels ⅘–1½ in. long, more or less diverging or (in *A. pectinatum*) quite patent; wings pink, or at length ferruginous, venose, back arcuate, front sinuous-crenulate; cells rugose, darker.—*A. pectinatum* is a form with setosely serrate leaves.

SECT. IV. *Leaves* 7–5-lobed and -nerved.

12. **A. Campbellii,** *Hook. f. & Thoms. mss. in Hb. Kew.; Brand. For. Fl.* 109; leaves 5–7-lobed glabrescent except axils of the 5–7 basal nerves serrulate both sides green base hollowed or truncate, cymes pyramidal or elongated subglabrous appearing with the leaves.

SIKKIM HIMALAYA, alt. 7–10,000 ft., *Herb. Griffith, J. D. H.*

A tree of 50 ft. *Leaves* of a beautifully green colour, pendulous, pilose beneath when quite young, 3–5 by 4–7 in.; lobes lanceolate or ovate-caudate; petioles reddish, $1\frac{3}{4}$–3. *Cymes* 2–6 in. long; flowers short, green. *Sepals* 5, ovate. *Petals* white, shorter than the sepals, obtuse, plicate at base. *Stamens* 8, reddish, about equalling the calyx; filaments short. *Fruit* glabrous, $\frac{3}{4}$–1 in. long; carpels divaricate; wings venose, widened above, back slightly curved; cells globose darker, nearly smooth.

13. **A. pictum,** *Thunb. Fl. Jap.* 162; leaves 5–7-lobed submembranous glabrescent except hairy tufts on the axils of the 5–7 basal nerves both sides green base cordate or hollowed lobes lanceolate or caudate entire, cymes corymbose appearing with the leaves. *Brand. For. Fl.* 112; *Miq. Ann. Mus. Lugd. Bat.* i. 251. A. lætum, *C. A. Mey. Verz. Pfl. Cauc.* 206; *Boiss. Fl. Orient.* i. 949. A. truncatum, *Bunge Enum. Pl. China Bor.* 10. A. cultratum, *Wall. Pl. As. Rar.* ii. 4; *Wall. Cat.* 1228. A. colchicum, *Hort.* A. sterculiaceum, *Griff. Itin. Notes* 148, *not of Wall.* A. Mono, *Maxim. Prim. Fl. Amur.* 68.

TEMPERATE HIMALAYA, from Kashmir, alt. 4–6000 ft., to Bhotan, alt. 9–10,000 ft.—DISTRIB. Eastward to China, Japan, and westward to Persia and the Caucasus.

A beautiful tree of small or moderate size. *Leaves* 2–$5\frac{1}{2}$ by $2\frac{1}{2}$–$6\frac{1}{2}$ in.; petioles glabrous, 1–$4\frac{1}{2}$ in. *Cymes* 1–6 in.; flowers $\frac{1}{6}$–$\frac{1}{5}$ in. long, on slender pedicels. *Sepals* oblong. *Petals* spathulate, equalling the calyx. *Stamens* 8, included. *Fruit* glabrous; carpels $1\frac{1}{2}$–$1\frac{3}{4}$ in. long, divaricating almost in one line; wings sinuous, venose, back arcuate; cells compressed.—Wood white, light, fine-grained.

20. **DOBINEA,** Hamilt.

A shrub with terete virgate branches. *Leaves* undivided, serrately toothed, opposite, exstipulate, petioled. *Panicles* terminal, pyramidal, leafy below, flowers small unisexual, glabrous. *Calyx* cup-shaped, 4-dentate, base subturbinate, altogether wanting in the female flower. *Petals* 4, lanceolate-spathulate, exceeding the calyx, wanting in the female flower. *Stamens* 8, alternately shorter, exserted, glabrous, wanting in the female flower; anthers short. *Disk* wanting in the male, annular in the female flower, glabrous. *Ovary* sessile, lenticular, 1-celled, rudimentary in the male flower; style filiform, spirally involute, stigmatose on the inner side and at the apex; ovule solitary, erect. *Fruit* compressed, shortly ciliated on the margin, indehiscent, borne on widely bracteate pedicels, the bract being adnate to the pedicel and exceeding both it and the fruit. *Seed* solitary, compressed, exalbuminous, exarillate; testa membranous; cotyledons flat, accumbent; radicle short.—DISTRIB. A monotypic genus.

1. **D. vulgaris,** *Hamilt. ex D. Don Prodr.* 249; leaves elliptic-lanceolate acutely acuminate minutely hairy on veins, acumen quite entire base rounded. *Wall. Cat.* 1229.

CENTRAL and EASTERN HIMALAYA; Nipal, *Wallich;* Sikkim, alt. 4–7000 ft., *J. D. H.;* Mishmi hills, *Griffith.*

Branched, 5–8 ft. high, aromatic or with smell of ivy. *Branchlets* shortly pubescent.

Leaves 3–7 by 1–2 in.; petioles $\frac{1}{5}$–1$\frac{2}{3}$ in., pubescent. *Panicles* ranging up to 2 ft. in width. *Flowers* $\frac{1}{15}$–$\frac{1}{20}$ in. diam.; bracts linear, shortly pubescent, free; those close to the fruit obcordate-orbicular, venose, $\frac{1}{2}$–$\frac{3}{5}$ in. diam., rose-coloured. *Fruit* $\frac{1}{8}$ in. diam.

21. **DODONÆA,** Linn.

Shrubs rarely arborescent. *Leaves* alternate, exstipulate. *Inflorescence* lateral and terminal. *Flowers* polygamous, inconspicuous. *Sepals* 5–2, imbricated or valvate. *Petals* wanting. *Stamens* 10–5, usually 8, inserted on the outer side of the disk; filaments short; anthers linear-oblong. *Disk* obsolete in the male flower, small in the female. *Ovary* 3–6-sided and -celled; style 3–6-sided, apex 3–6-cleft. *Ovules* 2 together, collateral or superposed. *Capsule* 2–6-sided, membranous or coriaceous, septicidally 2–6-valved; valves winged at the back; cells 1–2-seeded. *Seeds* lenticular or subglobose, compressed, exalbuminous, exarillate, funicle thickened; embryo spirally involute.—DISTRIB. A genus of some 40 species or more, mostly endemic in Australia.

Dodonæa (sp.) in *Herb. Hohenack.* n. 2355, is Aspidopterys canarensis, *Dalz.*

1. **D. viscosa,** *Linn. Mant. Pl. alt.* 228; leaves undivided oblanceolate viscid-shining glabrous subapiculate base cuneate-attenuate subsessile margin revolute entire or nearly so, cymes short, wings of each carpel oblong-orbicular extending from the base to the style. *Baker in Oliv. Fl. Trop. Afr.* i. 433; *Benth. Fl. Austral.* i. 475; *Brand. For. Fl.* 113; *Boiss. Fl. Orient.* i. 953. D. angustifolia, *Linn. f. Suppl. Pl.* 218; *Roxb. Fl. Ind.* ii. 256. D. dioica, *Roxb. Hort. Beng.* 28; *Fl. Ind.* ii. 256. D. Burmanniana, *DC. Prodr.* i. 616; *Wight Ill.* i. t. 52; *W. & A. Prodr.* 114; *Grah. Cat. Bomb. Pl.* 30; *Dalz. & Gibs. Bomb. Fl.* 36; *Thwaites Enum.* 59. D. pallida, *Miq. in Herb. Hohenack.* n. 1068. D. microcarpa, *DC. Prodr.* i. 617. D. Wightiana, *Blume Rumph.* iii. 189. D. pentandra, *Griff. Notul.* iv. 548. D. heterophylla, *Hortul. ex G. Don Gen. Syst.* i. 674. *Wall. Cat.* 8081. Ptelea viscosa, *Linn. Sp. Pl. ed.* i. 118; *Burm. Fl. Ind.* 36. D. spathulata, *Sm. in Rees Cycl.* xii. n. 2. D. arabica, *Hochst. & Steud. in Herb. Arab. Schimp.* n. 766.—*Burm. Fl. Zeyl.* t. 23. *Rumph. Herb. Amboin.* iv. t. 50.

Throughout INDIA, from the Indus Eastwards and Southwards to CEYLON and MALACCA.—DISTRIB. All warm countries.

An evergreen shrub occasionally growing into a small tree. *Shoots* terete or somewhat angular. *Leaves* more or less viscid with a shining yellowish resin, very variable in breadth, 1–5 by $\frac{1}{6}$–1$\frac{1}{2}$ in. *Sepals* oblong, $\frac{1}{10}$–$\frac{1}{8}$ in. long, about equalling the stamens. *Capsule* compressed, glabrous, $\frac{2}{3}$–1 in. broad.—Several synonyms, not strictly Indian, are omitted.

21.* **MELIANTHUS,** Tournef.

Shrubby glabrous plants with a strong odour. *Leaves* alternate, stipulate, unequally pinnate; leaflets toothed, decurrent. *Racemes* axillary and terminal. *Flowers* bracteate, hermaphrodite irregular, sometimes apetalous. *Calyx* laterally compressed, 5-partite, base with a saccate gibbosity; lobes unequal, imbricated. *Petals* excentric, declinate, subperigynous, narrow, long-clawed; the fifth petal very small or wanting. *Stamens* 4, didynamous, declinate, inserted within the disk. *Disk* unilateral, honeyed. *Ovary* oblong, 4-lobed, 4-celled, style filiform, 4-toothed deeply at apex; ovules 2–4 together. *Capsule* papery, vesicular, deeply 4-lobed, 4-celled. *Seeds* subglobose, exarillate; albumen fleshy or horny.—DISTRIB. A small South African genus.

1. **Melianthus major,** *Linn.*; a South African plant, occurs in Kumaon, where it is said to be an introduction, and has been cultivated in the Nilghiris where it was first noticed by Wight (Kew Distrib. n. 542); it is established at Ootacamund (*Bedd. Fl. Sylv. Anal. Gen.* lxxi.), and in Bhotan reaches a limit of 9500 feet (*Griff. Journ.* 265). It is an undershrub with glabrous coarsely serrate leaves emitting a fetid scent when bruised; it is synonymous with M. Himalayanus, *Wall. Cat.* 1190; *Miq. in Herb. Pl. Ind. Or. Hohenacker.* n. 1059; *Planch. in Trans. Linn. Soc. Lond.* xx. 416, t. 20, f. 1–13; *Hook. f. in Journ. Bot.* 1873, 356.—The claw of the petals was pubescent in the flower of Wallich's specimen, which I examined, and thus the character fails which Dr. Planchon relied on for the discrimination of Wallich's species.

22. **STAPHYLEA,** Linn.

Branched shrubs or trees, with terete branches. *Leaves* opposite, stipulate, trifoliate or pinnate; leaflets stipellate, serrulate. *Inflorescence* lateral and terminal, bracteate, pedicels jointed in the middle. *Flowers* regular, hermaphrodite, pendulous. *Sepals* 5, oblong, imbricated, coloured, deciduous. *Petals* 5, as long as the sepals, obovate, imbricated, white. *Stamens* 5, inserted on the edge of the disk between its lobes; filaments slender, pubescent below; anthers versatile, shortly oblong. *Ovary* 3–2-lobed and -celled; styles 3–2, slender; stigmas subcapitate; ovules 6 or more in each cell, in 2 rows, anatropous. *Capsule* membranous, vesicular-inflated, 3–2-lobed and -celled; carpels dehiscing at the apex along the ventral suture. *Seeds* few, subglobose, exarillate; testa hard; albumen fleshy.—DISTRIB. About 4 species occurring in North America, Europe, and Asia.

1. **S. Emodi,** *Wall. Cat.* 4275; leaves glabrescent or thinly pubescent beneath trifoliolate leaflets nearly equal ovate or elliptic acuminate pale beneath membranous base obtuse or cuneate lateral ones subsessile terminal one petioled, anthers shortly apiculate. *Brand. For. Fl.* 114.

WESTERN TEMPERATE HIMALAYA; from Marri to Kumaon, alt. 6–7000 ft.—DISTRIB. Affghanistan.

A small tree with spotted bark. *Leaves* 4–14 in.; leaflets 2–6 by 1–3 in.; petioles 1¼–6¼ in.; terminal petiole ⅓–1¾ in.; stipules linear, stipels setaceous, both caducous. *Cymes* rather dense, 1½–4 in.; flowers ½ in. long, about equalling the pedicels. *Capsules* 2–3 in. long; base turbinate.—Probably a form of the N. American S. trifolia, *Linn.*, differing only from the type by less pubescent foliage and anther-tips less obtuse.

23. **TURPINIA,** Vent.

Glabrous and shining trees or shrubs, with smooth terete branches. *Leaves* opposite, stipulate, usually odd-pinnate; leaflets opposite, stipellate, serrulate, subcoriaceous. *Panicles* terminal and axillary; flowers small, regular, hermaphrodite. *Calyx* 5-partite, imbricated. *Petals* 5, imbricated. *Stamens* 5, inserted outside the lobed or crenulate raised disk; filaments flattened; anthers short. *Ovary* sessile, 3-lobed and -celled; styles 3, combined or distinct; stigmas subcapitate; ovules 2 together or more and then in two rows. *Fruit* subglobose, indehiscent, 3-celled. *Seeds* angular; testa hard, shining; hile large; albumen fleshy; aril 0. *Embryo* straight.—DISTRIB. A genus of a few species widely dispersed.

1. **T. pomifera,** *DC. Prodr.* ii. 3; leaflets 3–9 elliptic oblong or ovate acuminate, primary branches of the panicles opposite. *Wall. Cat.* 4276.

Dalrympelia pomifera, *Roxb. Hort. Beng.* 17; *Cor. Pl.* t. 299; *Fl. Ind.* i. 633. T. nepalensis, *Wall. Cat.* 4277; *W. & A. Prodr.* 156; *Wight Ic.* t. 972; *Bedd. Fl. Sylv.* t. 159; *Thwaites Enum.* 71. T. microcarpa, *W. & A. Prodr.* 156. T. martabanica, *Wall. Cat.* 4278. T. latifolia, *Wall. Cat.* 4939. Canarium Sajiga, *Ham. ex W. & A. Prodr.* 175.—*Wall. Cat.* 8104.

EASTERN SUBTROPICAL HIMALAYA, from Nipal to Sikkim, alt. 2–7000 ft.; the KHASIA MTS.; ASSAM, SILHET, CACHAR, CHITTAGONG, BIRMA to PENANG. WESTERN PENINSULA; from the Concan southwards. CEYLON.—DISTRIB. Yunan, China, &c.

A leafy tree, sometimes large, occasionally only a shrub; foliage like that of Bischoffia javanica, *Blume. Leaves* 5–20 in. long; stipules interpetiolar, triangular, caducous; leaflets 2½–8 by 1–3 in.; petiolules of the lateral ones short, of the terminal ones ranging up to 2 in.; stipels lanceolate-subulate, caducous. *Fruit* ⅓–2 in. diam., purplish, red, yellow or green.—There are two well marked forms of this species, connected, however, by intermediate ones; α. leaflets more oblong, branches of the corymbose panicle rather stout, flowers yellowish ⅛ in. diam., petals not ciliate, ovules about 8 together, fruit very fleshy large; β. (*T. nepalensis*) leaflets more ovate, branches of the depresso-pyramidal panicle less stout, flowers white 1/12 in. diam., petals shortly ciliate, ovules 2–3 together, fruit small nearly dry. The synonymy for the extra-Indian forms is not given.

INDEX OF GENERA, SPECIES AND SYNONYMS.

The Synonyms and Species incidentally mentioned are printed in Italics.

Page
Abelmoschus angulosus, W. & A. 341
crinitus, Wall. . . 342
esculentus, W. & A. . 343
ficulneus, W. & A. . 340
moschatus, Mœnch . . 342
racemosus, Wall. . . 342
rugosus, W. & A. . 342
tetraphyllus, Grah. . 341
Warreensis, Dalz. . 341
Aberia, *Hochst.* . . 195
Gardneri, *Clos.* . . 195
Abroma, *Jacq.* . . . 375
angulata, Lamk. . 375
augusta, *Linn.* . . 375
fastuosum, Gærtn. . 375
Wheeleri, Retz. . . 375
Abutilon, *Gærtn.* . . 325
albidum, Webb. & Berth. 328
asiaticum, *G. Don* . 326
asiaticum, W. & A. 326
auritum (*Sida*) Wall. 328
Avicennæ, *Gærtn.* . 327
bidentatum, *Hochst.* 326
crispum, *G. Don* . 327
fruticosum, *Guill. & Perr.* 328
glaucum, Don . . 327
graveolens, *W. & A.* 327
hirtum, W. & A. . 327
indicum, *G. Don* . 326
Leschenaultianum, Don 325
microphyllum, A. Rich. 328
muticum, *G. Don* . 327
neilgherrense, *Munro* 328
periplocifolium, G. Don 325
polyandrum, *Schlecht* 325
populifolium, G. Don 326
ramosum, *Guill. & Perr.* 328

Page
sidoides, Dalz. & Gibs. 328
tomentosum, W. & A. 327
Acanthophyllum, *C. A. Mey.* 216
macrodon, *Edgw.* . 216
Acer, *Tournef.* . . . 692
acuminatum, Wall. . 695
Buzimpala, Ham. . 693
cæsium, *Wall.* . . 695
Campbellii, *H. f. & T.* 696
caudatum, *Wall.* . 695
colchicum, Hort. . 696
cultratum, Wall. . 696
Hookeri, *Miq.* . . 694
isolobum, *Kurz* . . 694
javanicum, *Jungh.* . 693
lætum, C. A. Mey. . 696
lævigatum, Wall. . 693
laurifolium, D. Don 693
laurinum, Hassk. . 693
Mono, Maxim. . . 696
niveum, *Bl.* . . . 693
oblongum, *Wall.* . 693
pectinatum, Wall. . 695
pentapomicum, *J. L. Stew.* 694
pictum, *Thunb.* . . 696
platanifolia, Griff. . 695
sikkimense, *Miq.* . 694
stachyophyllum, *Hiern* 694
sterculiaceum, Wall. 695
sterculiaceum, Griff. 696
Thomsoni, Miq. . . 695
truncatum, Bunge . 696
villosum, *Wall.* . . 695
Achyranthes corymbosa, Linn. . . 245
Aconitum, *Linn.* . . 27
Atees, Royle . . . 29
cordatum, Royle . . 29

Page
dissectum, Don . . 29
ferox, *Wall.* . . . 28
ferox, Wall. . . . 29
heterophyllum, *Wall.* 29
læve, Royle . . . 28
lethale, Griff. . . . 28
luridum, *H. f. & T.* 28
Lycoctonum, *Linn.* . 28
multifidum, Royle . 29
Napellus, *Linn.* . . 28
oliganthemum, Kerner 29
palmatum, *Don* . 28
rotundifolium, Kar & Kir. 29
Tianschanicum, Ost. & Rupr. . . . 29
uncinatum, *Linn.* . 28
variegatum, H. f. & T. 28
virosum, Don . . 28
Acosmia rupestris, Benth. 217
Acronodia punctata, Bl. 408
Acronychia, *Forst.* . . 498
laurifolia, *Bl.* . . 498
pedunculata, Miq. . 498
Porteri, *H. f.* . . 498
Acrotrema, *Jack.* . . 32
Arnottianum, *Wight* 32
bullatum, Thw. . . 33
costatum, *Jack.* . 32
costatum, Wall. . . 32
dissectum, *Thw.* . 34
Gardneri, *Thw.* . . 33
intermedium, *Thw.* . 33
lanceolatum, *Hook.* . 33
lyratum, *Thw.* . . 34
sylvaticum, Thw. . 33
Thwaitesii, *H. f. & T.* 34
uniflorum, *Hook.* . 33
Walkeri, *Wight* . . 33
Wightianum, W. & A. 32

Page
Wightianum, Wall. 32
Actæa, *Linn.* 29
acuminata, Wall. 29
cimicifuga, Linn. 30
frigida, Royle 30
spicata, *Linn.* 29
Actinidia, *Lindl.* 285
callosa, *Lindl.* 286
Kolomitka, Rupr. 286
strigosa, *Hook.* 286
Adansonia, *Linn.* 348
digitata, *Linn.* 348
Adenostemma glandulosum, Benth. 242
Adinandra, *Jack.* 281
acuminata, *Korth.* 282
crenulata, *T. And.* 283
cyrtopoda, Miq. 282
dasyantha, Chois. 282
dumosa, *Jack.* 282
glabra, Miq. 282
Griffithii, *Dyer* 282
integerrima, *T. And.* 282
Jackiana, Korth. 282
lasiopetala, *Chois.* 283
maculosa, *T. And.* 282
stylosa, Miq. 282
trichocoryna, Korth. 282
villosa, *Chois.* 283
Adonis, *Linn.* 15
æstivalis, *Linn.* 15
chrysocyathus, *H. f. & T.* 15
Inglisii, Royle 15
marginata, Bienert 15
pyrenaica, H. f. & T. 15
scrobiculata, *Boiss.* 15
Ægle, *Corr.* 516
Marmelos, *Corr.* 516
Æsculus, *Linn.* 675
asamicus, Griff. 675
Hippocastanum, Linn. 675
indica, *Colebr.* 675
punduana, *Wall.* 675
Aglaia, *Lour.* 554
? andamanica, *Hiern* 555
apiocarpa, *Hiern* 555
chittagonga, Miq. 560
cordata, *Hiern* 557
crassinervia, *Kurz* 556
? *decandra*, Wall. 562
Dookoo, Griff. 558
edulis, *A. Gr.* 556
glabriflora, *Hiern* 555
grata, Wall. 555
khasiana, *Hiern* 554

Page
lepidota, Miq. 555
midnaporensis, Carey 555
minutiflora, *Bedd.* 557
odorata, *Lour.* 554
palembanica, *Miq.* 557
pentaphylla, Kurz 554
perviridis, *Hiern* 556
polyantha, Bedd. 557
? *polystachya*, Wall. 559
Roxburghiana, *Miq.* 555
sexipetala, Griff. 556
Sippannas, Miq. 557
Spanoghei, Bl. 555
spectabilis, Hort. Calc. 561
tenuicaulis, *Hiern* 556
tomentosa, Teysm. & Binnend. 557
Wallichii, *Hiern* 555
Agrostemma inflata, Don 225
Ailantus, *Desf.* 518
excelsa, *Roxb.* 518
glandulosa, *Desf.* 518
malabarica, *DC.* 518
Alima ? cristatum, Wall. 651
Allophyllus lanatus, Roxb. 674
ornitrophioides, Rox. 674
ternatus, Lour. 674
Allophylus, *Linn.* 673
Cobbe, *Bl.* 673
pinnatus, Roxb. 674
zeylanicus, *Linn.* 673
Alphonsea, *H. f. & T.* 88
elliptica, *H. f. & T.* 90
lutea, *H. f. & T.* 89
madraspatana, *Bedd.* 89
Maingayi, *H. f. & T.* 90
sclerocarpa, *Thw.* 89
ventricosa, *H. f. & T.* 89
zeylanica, *H. f. & T.* 89
Alsine Meyeri, Boiss. 236
Roylei, Fenzl 236
ALSINEÆ 213
Alsinella Wallichiana, Benth. 230
Alsodeia, *Thouars.* 186
bengalensis, *Wall.* 186
Brownii, Korth. 187
dasycaula, Miq. 188
echinocarpa, *Korth.* 188
Griffithii, *H. f. & T.* 187
lanceolata, *Wall.* 188
macrophylla, Don 187
Maingayi, *H. f. & T.* 188
mollis, *H. f. & T.* 188
obtusa, *Korth.* 187
racemosa, *H. f. & T.* 187

Page
Roxburghii, *H. f.* 186
virgata, *Thw.* 189
Wallichiana, *H. f. & T.* 187
zeylanica, *Thw.* 187
ALSODEIEÆ 182
Althæa, *Linn.* 319
chinensis, Wall. 319
coromandelina, Cav. 319
Ludwigii, *Linn.* 319
officinalis, *Linn.* 319
rosea, Linn. 319
Taurinensis, DC. 319
ALYSSINEÆ 129
Alyssum, *Linn.* 141
canescens, DC. 141
maritimum, Linn. 141
minimum, *Willd.* 141
tenuifolium, DC. 141
cochlearioides 145
Alytostylis parviflora, Griff. 409
Amoora, *Roxb.* 559
? *auriculata*, Miq. 560
canarana, *Benth. & H. f.* 560
? Championii, *Benth. & H. f.* 562
chittagonga, *Hiern* 559
cucullata, *Roxb.* 560
decandra, *Hiern* 562
lanceolata, *Hiern* 560
Lawii, *Benth.* 561
macrophylla, Nimmo 559
Maingayi, *Hiern* 562
Rohituka, *W. & A.* 559
rubescens, *Hiern* 561
rubiginosa, *Griff.* 561
spectabilis, *Miq.* 561
AMPELIDEÆ 644
Ampelopsis himalayana, Royle 656
neilgherrensis, Wight 656
? *ternata*, DC. 650
Amyris acuminata, Roxb. 530
? *Agallocha*, Roxb. 529
Commiphora, Roxb. 529
dentata, Willd. 506
gileadensis, Roxb. 530
heptaphylla, Roxb. 504
pentaphylla, Roxb. 504
punctata, Roxb. 505
simplicifolia, Roxb. 513
suffruticosa, Roxb. 506
sumatrana, Roxb. 505
zeylanica, Retz. 532
Anacolosa, *Bl.* 580
densiflora, *Bedd.* 580

Page
Griffithii, *Mast.* . . . 580
? heptandra, *Maing.* 581
ilicoides, *Mast.* . . . 580
Maingayi, *Mast.* . . 580
puberula, *Kurz* . . 581
Anamirta, *Colebr.* . . . 98
Cocculus, *W. & A.* . . 98
flavescens, Miers . . 98
paniculata, Colebr. . . 98
toxifera, Miers . . . 98
Anaxagorea, *St. Hil.* . . 68
javanica, Bl. . . . 68
luzonensis, *A. Gr.* . . 68
zeylanica, H.f. & T. 68
Ancistrocladus, *Wall.* . . 299
attenuatus, *Dyer.* . . 300
extensus, *Wall.* . . . 299
extensus, Wall. ? . . 300
Griffithii, *Planch.* . . 300
Heyneanus, *Wall.* . . 299
pinangianus, *Wall* . . 300
sagittatus, *Wall.* . . 300
? *sagittatus*, Wall. . . 526
stelligerus, Wall. . . 300
Vahlii, *Arn.* 299
Wallichii, *Planch.* . . 300
Ancistrolobus glaucescens, Turcz. . . 258
Andersonia cucullata, Roxb. 560
Rohitoca, Griff. . . 559
Rohituka, Roxb. . . 559
Anemone, *Linn.* . . . 7
albana, *Stev.* 7
biflora, *DC.* 7
curta, Wall. 2
cynosurus, Griff. . . 16
demissa, *H. f. & T.* 9
discolor, Royle . . . 8
dubia, Wall. . . . 9
elongata, *Don* . . . 10
Falconeri, *Thoms.* . . 8
geraniifolia, Wall. . . 9
Gortschakowii, Kar. & Kir. 7
Govaniana, Wall. . . 8
Govaniana, Royle . . 9
Griffithii, *H. f. & T.* 8
hispida, Wall. . . . 9
longiscapa, Wall. . . 9
micrantha, Klotzsch 8
mollis, Wall. 8
narcissiflora, *Linn.* . . 10
obtusiloba, *Don* . . 8
polyanthes, *Don* . . 9
rivularis, *Ham.* . . . 9
rivularis, Wall. . . . 10
rupestris, *Wall.* . . 9
rupicola, *Camb.* . . . 8
scaposa, Edgw. . . . 9
tetrasepala, *Royle* . 10
trullifolia, *H. f. & T.* 9
villosa, Royle . . . 9
vitifolia, *Ham.* . . . 8
Wallichiana, Royle 7
Wightiana, Wall. . 9
ANEMONEÆ 1
Anisadenia, *Wall.* . . 412
Khasyana, Griff. . 412
pubescens, *Griff.* . 413
saxatilis, *Wall.* . . 412
Anisoptera, *Korth.* . . . 300
glabra, *Kurz* . . . 301
oblonga, *Dyer* . . . 301
odorata, Kurz . . . 301
Anneslea, *Wall.* . . . 280
crassipes, *Hook.* . . . 280
fragrans, *Wall.* . . . 280
Anneslia spinosa, Roxb. 115
Anomosanthes deficiens, Bl. 671
Anoda, *Cav.* 321
hastata, *Linn.* . . . 321
Anona, *Linn.* 78
reticulata, *Linn.* . . 78
squamosa, *Linn.* . . . 78
ANONACEÆ 45
Anquetilia Laureola, Dcne. 499
Antheeischima excelsa, Korth. 291
Antichorus depressus, Linn. 398
Antitaxis, *Miers* . . . 106
fasciculata, *Miers* . 106
Aporetica ternata, J.R. & G. Forst. . . 674
Apodytes, *E. Mey.* . . . 587
Andamanica, *Kurz* . 588
Beddomei, *Mast.* . . 588
Benthamiana, *Wight* 588
Gardneriana, *Miers* . 588
Apteron, *Kurz* 643
lanceolatum, *Kurz* . 643
Aquilegia, *Linn.* . . . 23
alpina, Linn. . . . 24
fragrans, Benth. . . 24
glandulosa, Fisch. . 24
glauca, Lindl. . . . 24
jucunda, Fisch. & Mey. 24
Kanawarensis, Camb. 24
Moorcroftiana, Wall. 24
Olympica, Boiss. . 24
pubiflora, Wall. . . 24
pyrenaica, DC. . . 24
viscosa, Gouan . . 24
vulgaris, *Linn.* . . 24
vulgaris, DC. . . . 24
Aquilicia ottilis, Gærtn. 667
sambucina, Linn. . 667
ARABIDEÆ 128
Arabis, *Linn.* 135
albida, Stev. . . . 136
alpina, *Linn.* 135
amplexicaulis, *Edgw.* 136
Aucheri, Boiss. . . 135
auriculata, *Lamk.* . 135
glabra, *Crantz* . . 135
glandulosa, *Kar & Kir.* 136
incanescens, Munro . 140
? *leptocarpa*, Wall. . 149
Montbretiana, Boiss. 135
nuda, *B. Lang.* . . 137
perfoliata, Lamk. . 135
pterosperma, Edgw. . 136
scapigera, Boiss. . 137
taraxacifolia, *Anders.* 136
Thaliana, Linn. . . 148
Thomsoni, H. f. . . 136
tibetica, *H. f. & T.* 136
Araliacea? Kleinii, W. & A. . . . 593
Archytæa, *Mart.* . . . 293
Vahlii, *Chois.* . . . 294
Arenaria, *Linn.* . . . 235
Benthami, *Edgw.* . 242
ciliolata, *Edgw.* . . 240
debilis, *H. f.* . . . 242
densissima, *Wall.* . 239
festucoides, *Benth.* . 236
flaccida, Roxb. . . . 243
foliosa, *Royle* . . . 236
glanduligera, *Edgw.* 240
globiflora, *Wall.* . 238
Griffithii, *Boiss.* . . . 237
holosteoides, *Edgw.* . 241
? *imbricata*, M. Bieb. 237
juniperina, Fenzl . 236
Kashmerica, *Edgw.* 236
melandryoides, *Edgw.* 241
Meyeri, *Boiss.* . . . 236
monticola, *Edgw.* . 238
musciformis, *Wall.* . . 237
neelgerrensis, *W. & A.* 239
orbiculata, *Royle* . 240
oreophila, *H. f.* . . 238
polytrichoides, *Edgw.* 237
pulvinata, *Edgw.* . 238
rotundifolia, M. Bieb. 240
rubra, Linn. 244
rupicola, Fenzl . . 243

Page
serpyllifolia, *Linn.* 239
Stracheyi, *Edgw.* 240
tenera, *Edgw.* 242
trichotoma, *Royle mss.* 235
Wallichiana, Seringe 239
Argemone, *Linn.* 117
mexicana, *Linn.* 117
Aristega lævifolia, *Miers* 101
Artabotrys, *Br.* 53
burmanicus, *A. DC.* 55
caudatus, *Wall.* 55
crassifolius, *H. f. & T.* 54
hamatus, Bl. 54
Kurzii, *H. f. & T.* 54
Maingayi, *H. f. & T.* 55
malayana, *Griff.* 83
odoratissimus, *Br.* 54
pleurocarpus, *Maing.* 54
speciosus, *Kurz* 55
suaveolens, *Bl.* 55
zeylanicus, *H. f. & T.* 54
Arthromischus armatus, Thw. 511
Arytera ? macrocarpa, Miq. 528
Ascyrum, *Linn.* 252
filicaule, *Dyer* 252
Aspidocarya, *H. f. & T.* 95
uvifera, *H. f. & T.* 95
Aspidopterys, *Juss.* 419
canarensis, *Dalz.* 420
concava, *Juss.* 420, 422
cordata, *Juss.* 421
glabriuscula, Juss. 420
glomerata, Wight 420
hirsuta, *Juss.* 421
lanuginosa, Juss. 421
nutans, *H. f.* 421
nutans, Juss. 421
oxyphylla, Juss. 420
rotundifolia, Juss. 421
Roxburghiana, *Juss.* 420
Roxburghiana, Juss. 421
tomentosa, *Juss.* 422
Wallichii, *H. f.* 421
Astrogyne coriacea, Wall. 629
Atelanthera, *H. f. & T.* 133
perpusilla, *H. f. & T.* 133
Atalantia, *Corr.* 511
? bilocularis, *Wall.* 514
? bilocularis, Wall. 508
buxifolia, Oliv. 508
capitellata, Lindl. 512
carissoides, Wall. 512

Page
caudata, *H. f.* 513
ceylanica, *Oliv.* 512
floribunda, Wight 512
missionis, *Oliv.* 513
monophylla, *Corr.* 511
platystigma, Wight 512
racemosa, *W. & A.* 512
Roxburghiana, *H. f.* 513
Roxburghiana, Oliv. 513
Atragene zeylanica, Linn. 7
Atrategia, Bedd. 74
Thomsoni, Bedd. 75
AURANTIEÆ 484
Averrhoa, *Linn.* 439
Bilimbi, *Linn.* 439
Carambola, *Linn.* 439
Azadirachta indica, Juss. 544
Azanza acuminata, Alef. 345
Lampas, Alef. 345

Balanites, *Del.* 522
ægyptiaca, Wall. 522
Roxburghii, *Planch.* 522
Balanopteris minor, Gærtn. 363
Tothila, Gærtn. 363
Balsamina chinensis, DC. 444
coccinea, DC. 454
cornuta, DC. 454
fasciculata, DC. 444
hortensis, DC. 454
latifolia, DC. 450
Leschenaultii, DC. 451
minor, DC. 446
mysorensis, DC. 456
oppositifolia, DC. 448
rosmarinifolia, DC. 448
BALSAMINEÆ 427
Balsamodendron, *Kth.* 529
Berryi, *Arn.* 529
Gileadense, DC. 530
Mukul, *Hook.* 529
pubescens, *Stocks* 529
Roxburghii, *Arn.* 529
Roxburghii, Stocks 529
? Wightii, Arn. 529
Balsamodendrum ? zeylanicum, Kth. 532
Bamia angulosa, Wall. 341
cancellata, Wall. 342
crinita, Wall. 342
fusiformis, Wall. 342
magnifica, Wall. 342
pungens, Wall. 341

Page
rugosa, Wall. 342
tetraphylla, Wall. 341
Banisteria bengalensis, Linn. 418
tetraptera, Sonn. 418
unicapsularis, Lamk. 418
Barbarea, *Br.* 134
arcuata, Reichb. 134
elata, *H. f. & T.* 135
Iberica, DC. 134
intermedia, Boreau 134
præcox, Fries 134
vulgaris, *Br.* 134
Barclaya, *Wall.* 115
longifolia, *Wall.* 115
Baterium validum, Miers 106
Beddomea, *H. f.* 566
indica, *H. f.* 566
simplicifolia, *Bedd.* 566
BERBEREÆ 107
BERBERIDEÆ 107
Berberis, *Linn.* 108
acanthifolia, Wall. 109
ætnensis, Presl. 109
affinis, Don 110
angulosa, *Wall.* 111
angustifolia, Roxb. 110
aristata, *DC.* 110
aristata, DC. 110
asiatica, *Roxb.* 110
asiatica, Griff. 111
atroviridis, Wall. 111
Bealii, Hort. 109
brachybotrys, Edgw. 109
ceratophylla, Don 110
chitria, Ham. 110
concinna, *H. f.* 111
coriaria, Royle 110
cratægina, DC. 109
cretica, Linn. 109
emarginata, Willd. 109
floribunda, Wall. 110
heteropoda, Schrenck 109
hypoleuca, Lindl. 110
insignis, *H. f. & T.* 111
Kunawarensis, Roy. 109
Leschenaultii, Wall. 109
Lycium, *Royle* 110
macrosepala, *H. f.* 111
miccia, Ham. 109
nepalensis, *Spr.* 109
petiolaris, Wall. 110
sphærocarpus, Kar & Kir. 109
Thunbergii, DC. 109
tinctoria, Lesch. 110
turcomanieæ, Kar 109

Page
ulicina, *H. f. & T.* 111
umbellata, *Wall.* 110
umbellata, Lindl. 110
vulgaris. *Linn.* 109
Wallichiana, *DC.* 110
Wallichiana, DC. 111
Berchemia, *Neck.* 637
calophylla, G. Don 636
Edgworthii, *Law.* 638
flavescens, *Wall.* 637
floribunda, *Wall.* 637
? *hamosa*, Wall. 641
laxa, Wall. 637
lineata, *DC.* 638
? *oppositifolia*, Wall. 641
? *parviflora*, Wall. 641
? *Poiretiana*, DC. 638
polyphylla, *Wall.* 638
Bergera integerrima, Roxb. 501, 502
Kœnigii, Linn. 503
nitida, Thw. 505
villosa, Wall. 502
Bergia, *Linn.* 251
æstivosa, *W. & A.* 251
ammannioides, *Roxb.* 251
aquatica, Roxb. 252
capensis, Linn. 252
odorata, *Edgw.* 251
pentandra, Guill. & Perr. 251
suffruticosa, Fenzl 251
trimera, Fisch. & Mey. 252
verticillata, *Willd.* 252
Berrya, *Roxb.* 383
Ammonilla, *Roxb.* 383
mollis, Wall. 383
Biebersteinia, *Stephan.* 427
emodi, *Jaub. & Spach* 427
odora, Royle 427
Binnendykia trichostylis, Kurz. 379
Biophytum, *DC.* 436
adiantoides, *Wight* 437
Apodiscias, *Turcz.* 437
Candolleanum, Wight 437
Cumingianum, Turcz. 437
intermedium, *Wight* 438
nervifolium, Thw. 437
nudum, *Arn.* 438
polyphyllum, *Munro* 439
poterioides, Edgw. 437
proliferum, *Arn.* 438
Reinwardtii, *Walp.* 437
sensitivum, *DC.* 436

Page
sesbanioides, Edgw. 437
verticillatum, Wight 439
Bixa, *Linn.* 190
Orellana, *Linn.* 190
BIXEÆ 189
BIXINEÆ 189
Bocagea, *St. Hil.* 92
coriacea, *H. f. & T.* 93
Dalzellii, *H. f. & T.* 92
elliptica, *H. f. & T.* 92
obliqua, *H. f. & T.* 93
Thwaitesii, *H. f. & T.* 92
Bœnninghausenia, *Reichb.* 486
albiflora, *Reichb.* 486
BOMBACEÆ 318
Bombax, *Linn.* 349
Ceiba, Burm. 349
gossypium, Linn. 190
heptaphylla, Cav. 349
insigne, *Wall.* 349
malabaricum, *DC.* 349
orientale, Spr. 350
pentandrum, Linn. 350
BONNETIEÆ 280
Boschia, *Korth.* 351
Griffithii, *Mast.* 352
Boswellia, *Roxb.* 527
glabra, Roxb. 528
serrata, *Roxb.* 528
thurifera, Roxb. 528
Boymia glabrifolia, Champ. 490
rutæcarpa, Juss. 490
Brachystemma, *Don* 235
calycinum, *Don* 235
Brasenia, *Schreb.* 113
peltata, *Pursh.* 113
Brassica, *Linn.* 155
alba, *H. f. & T.* 157
arvensis, Linn. 158
campestris, *Linn.* 156
Eruca, Linn. 158
erucoides, Roxb. 158
foliosa, Willd. 157
Griffithii, H. f. & T. 157
juncea, *H. f. & T.* 157
Napus, Linn. 156
nigra, *Koch* 156
quadrivalvis, *H. f. & T.* 156
Rapa, Linn. 156
Stocksii, H. f. & T. 156
Tournefortii, *Gouan* 156
trilocularis, *H. f. & T.* 156
Willdenovii, Boiss. 157
BRASSICEÆ 129

Page
Braya, *Sternb. & Hoppe* 155
alpina, *Sternb. & Hoppe* 155
? *oxycarpa*, H. f. & T. 155
rosea, *Bunge* 155
Thomsoni, H. f. & T. 155
tibetica, *H. f. & T.* 155
uniflora, *H. f. & T.* 155
Brewstera crenata, Rœm. 416
Brindonia indica, Thouars 261
Brotera ovata, Cav. 372
bracteosa, Guill. & Perr. 373
Brownlowia, *Roxb.* 381
elata, *Roxb.* 381
lanceolata, *Benth.* 381
BROWNLOWIEÆ 380
Brucea, *Mill.* 520
dubia, Stend. 520
mollis, *Wall.* 521
sumatrana, *Roxb.* 521
Bryomorpha rupifraga, Kar. & Kir. 243
Buboma tomentosa, Spreng. 375
Buchanania spicata, Hb. Roxb. 559
Buettneria, *Linn.* 376
andamanensis, *Kurz* 377
aspera, *Colebr.* 377
catalpifolia, Wall. 376
crenulata, *Wall.* 376
echinata, Wall. 376
elliptica, *Mast.* 377
grandifolia, DC. 377
herbacea, *Roxb.* 376
hypoleuca, Turcz. 378
Jackiana, *Wall.* 376
Maingayi, *Mast.* 377
nepalensis, Turcz. 377
pilosa, *Roxb.* 377
polyacantha, Wall. 376
uncinata, *Mast.* 377
velutina, Wall. 377
BUETTNERIEÆ 354
Bursera, *Linn.* 530
*serrata, *Wall.* 530
serrata, Wall. 508
BURSERACEÆ 527

CABOMBEÆ 113
Cadaba, *Forsk.* 172
dubia, DC. 173
farinosa, *Forsk.* 173

---

* Incorrectly attributed to Colebroke at p. 530.

Page

- heterotricha, *Stocks* . 173
- indica, *Lamk.* . . . 172
- trifoliata, *W. & A.* . 172
- *triphylla*, Wight . 172

CAKILINEÆ 130

Calathodes, *H. f. & T.* 22
- palmata, *H. f. & T.* 22

Callianthemum, *C. A. Mey.* 14
- cachemirianum, *Cam.* 14
- *Endlicheri*, Walp. . 21
- *pimpinelloides*, H.f. & T. 14

Calophyllum, *Linn.* . 271
- *amœnum*, Wall. . . 272
- angustifolium, *Roxb.* 276
- *bancanum*, Miq. . . 272
- *Bintagor*, Roxb. . 273
- bracteatum, *Thw.* . 274
- Burmanni, *Wight* . 272
- canum, *H. f.* . . . 271
- *chinense*, Walp. . . 270
- cordato-oblongum, *Thw.* 275
- cuneifolium, *Thw.* . 275
- *cymosum*, Miq. . . 271
- **decipiens*, Wight . 274
- *decipiens*, Thw. . . 275
- *elatum*, Bedd. . . 274
- floribundum, *H. f.* . 272
- *gracile*, Miq. . . . 271
- *Griffithii*, T. Anders. 273
- inophyllum, *Linn.* . 273
- *longifolium*, Wight 270
- macrocarpum, *H. f.* 273
- ? marginatum, *Wall.* 276
- *messuæfolium*, Wall. 272
- microphyllum, *T. Anders.* 272
- *Moonii*, Wight . . 271
- *pisiferum*, Planch & Tr. 272
- *plicipes*, Miq. . . 272
- polyanthum, *Wall.* 274
- pulcherrimum, *Wall.* 271
- retusum, *Wall.* . . 272
- spectabile, *Willd.* . 271
- *spurium* Chois. . . 274
- Suriga, *Buch.* . . 276
- *tetrapetalum*, Roxb. 271, 273
- Thwaitesii, *Planch. & Tr.* 275
- tomentosum, *Wight* . 274
- trapezifolium, *Thw.* 275
- Walkeri, *Wight* . . 275
- Wallichianum, *Planch. & Tr.* . . 273
- Wightianum, *Wall.* . 274

Caltha, *Linn.* 21
- *alba*, Jacq. . . . 21
- *Goraniana*, Wall. . 21
- *Himalensis*, Don . 21
- palustris, *Linn.* . . 21
- *paniculata*, Wall. . 21
- scaposa, *H. f. & T.* . 21

Calysaccion longifolium, Wight . . 270
- *siamense*, Miq. . . 271

Camelina Caisir, Wall. 145

CAMELINEÆ 129

Camellia, *Linn.* . . 292
- ? *acuminata*, Wall. . 290
- *axillaris*, Griff. . . 282
- caudata, *Wall.* . . 293
- *caudata*, Griff. . . 293
- drupifera, *Lour.* . . 293
- *japonica*, Wall. . . 292
- *Keina*, Don . . . 293
- *Kissi*, Wall. . . . 293
- lutescens, *Dyer* . . 293
- *Mastersia*, Griff. . 293
- *oleifolia*, Wall. . . 293
- ? *Scottiana*, Wall. . 292
- ? *Scottiana*, Chois. . 282
- *simplicifolia*, Griff. 293
- *symplocifolia*, Griff. 293
- theifera, *Griff.* . . 292

Camunium bengalense, Hb. Ham. . 556
- *chinense*, Roxb. . . 554
- *sinense*, Rumph. . . 554

Cananga, *Rumph.* . . 56
- ? monosperma, *H. f. & T.* 57
- odorata, *H. f. & T.* . 56
- virgata, *H. f. & T.* . 57

Canarium, *Linn.* . . 531
- *balsamiferum*, Moon 532
- bengalense, *Roxb.* . 534
- brunneum, *Bedd.* . 531
- coccineo-bracteatum, *Kurz.* 536
- commune, *Linn.* . . 531
- euphyllum, *Kurz* . 535
- grandiflorum, *A. W. Benn.* 533
- hirtellum, *A. W. Benn.* 534
- Kadondon, *A. W. B.* 535
- *lævigatum*, Miq. . 538
- laxum, *A. W. Benn.* 535
- nitidum, *A. W. Benn.* 533
- parvifolium, *A. W. Benn.* 536
- pilosum, *A. W. Benn.* 533
- purpurascens, *A. W. Benn.* 532
- rubiginosum, *A. W. Benn.* 535
- rufum, *A. W. Benn.* 533
- *sajiga*, Ham. . . . 699
- secundum, *A. W. Benn.* 532
- strictum, *Roxb.* . . 534
- zeylanicum, *Bl.* . . 532

Cansjera, *Juss.* . . 582
- *malabarica*, Lamk. . 582
- *martabanica*, Wall. . 582
- parvifolia, *Kurz* . 583
- Rheedii, *Gmelin.* . 582
- *scandens*, Roxb. . . 582
- *zizyphifolia*, Griff. . 582

CAPPAREÆ 168

CAPPARIDEÆ 167

Capparis, *Linn.* . . 173
- acuminata, *Willd.* . 178
- *acuminata*, Roxb. . 174
- *accuminata*, Willd. (Wall. Cat.) . . 178
- *Ægyptiaca*, Linn. . 173
- apetala, *Roth.* . . 171
- aphylla, *Roth.* . . 174
- assamica, *H. f. & T.* 177
- *bisperma*, Wight . 176
- *bisperma*, Roxb. . 176
- *brevispina*, DC. . . 174
- *callosa*, Bl. . . . 179
- cærulea, *Heyne* . . 175
- *conspicua*, Wall. . 179
- *corymbosa*, Roxb. . 176
- divaricata, *Lamk.* . 174
- *divaricata*, Wall. . 175
- diversifolia, *W. & A.* 175
- *erythrodasys*, Miq. 178
- Finlaysoniana, *Wall.* 179
- *Finlaysonina*, Wall. 179
- flavicans, *Wall.* . . 179
- floribunda, *Wight* . 177
- *formosa*, Dalz. . . 174
- *formosa*, Wall. . . 178
- *galeata*, Fres. . . 173
- glauca, *Wall.* . . 180
- grandiflora, *Wall.* . 174
- grandis, *Linn* . . 176
- *herbacea*, Willd. . . 173
- *heteroclita*, Roxb. . 171
- Heyneana, *Wall.* . 174

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* Inadvertently quoted under C. Walkeri, p. 275.

Page
horrida, *Linn. f.* 178
incanescens, DC. 177
leucophylla, DC. 173
linifolia, Roxb. 171
longispina, *H. f. & T.* 176
malabarica, Wall. 177
maximus, Roth. 176
micracantha, *DC.* 179
molliuscula, *Wall.* 180
Moonii, *Wight* 175
multiflora, *H. f. & T.* 178
Murrayana, Grah. 173
nepalensis, Wall. 173
obovata, Royle 173
obovata, Ham. 176
olacifolia, *H. f. & T.* 178
oligandra, Griff. 177
orbiculata, *Wall.* 176
oxyphylla, Wall. 179
parviflora, *H. f. & T.* 176
pedunculosa, *Wall.* 176
pumila, *Champ.* 177
punctata, Wall. 177
pyrifolia, W. & A. 174
quadriflora, DC. 178
racemifera, DC. 176
reticulata, Klein 175
retusella, Thw. 177
Rheedii. Rottb. 174
rotundifolia, Rottb. 174
Roxburghii, *DC.* 175
rupestris, Sibth. 173
sabiæfolia, *H. f. & T.* 179
salaccensis, Bl. 175
sepiaria, *Linn.* 177
sepiaria, Wall. 176
Sodada, Br. 175
spinosa, *Linn.* 173
stylosa, DC. 174
tenera *Dalz.* 179
tenuiflora, DC. 178
tetrasperma, Thw. 179
trifoliata, Roxb. 172
trinervia, *H. f. & T.* 175
uncinata, Wall. 179
variabilis, *Wall.* 180
versicolor, *Griff.* 175
viminea, *H. f. & T.* 179
Wallichiana, W. & A. 174
zeylanica, Roxb. 178
zeylanica, W. & A. 178
zeylanica, *Linn.* 174
Capsella, *Mœnch.* 159
Bursa-pastoris, *Mœnch.* 159
elliptica, *C. A. Mey.* 159
procumbens, Boiss. 159
Thomsoni, *H. f.* 159

Page
Carapa, *Aubl.* 566
indica, Juss. 567
moluccensis, *Lamk.* 567
obovata, Bl. 567
Cardamine, *Linn.* 137
africana, *Linn.* 137
anteniquana, DC. 137
borbonica, Pers. 137
circæoides, *H. f. & T.* 137
debilis, Don 138
elegantula, *H. f. & T.* 139
foliosa, Wall. 139
Griffithii, *H. f. & T.* 139
hirsuta, *Linn.* 138
hirsuta, H. f. & T. 138
impatiens, *Linn.* 138
macrophylla, *Willd.* 139
macrophylla, Ledeb. 139
nilagirica, Schlecht. 138
pectinata, DC. 138
polyphylla, Don 139
pratensis, *Linn.* 138
subumbellata, *Hook. mss.* 138
sylvatica, Link. 138
trifoliolata, *H. f. & T.* 138
violacea, *Wall.* 137
Wightiana, Wall. 137
Cardiopteris, *Wall.* 597
javanica, Bl. 597
lobata, *Br.* 597
moluccana, Bl. 597
Rumphii, Baill. 597
subhamata, Wall. 598
Cardiospermum, *Linn.* 669
canescens, *Wall.* 670
Halicacabum, *Linn.* 670
microcarpum, H. B. K. 670
? *ovatum*, Wall. 670
pubescens, Griff. 670
Schmidelia, Dalz. & Gibs. 670
villosa, Dalz. & Gibs. 670
Cardiostegia Kotschyi, Presl. 373
Carpophora Hoffmeisteri, Klotzsch 220
Carria speciosa, Gardn. 292
CARYOPHYLLEÆ 212
Cassine discolor, Wall. 614
excelsa, Wall. 603
Catha Benthamii, Gardn. & Champ. 618
emarginata, Don 621
fruticosa, Thw. 619
Heyneana, Walp. 620
monosperma, Benth. 618

Page
montana, G. Don 621
ovata, Walp. 619
Rothiana, Walp. 620
rufa, Don 620
Wallichii, Don 621
zeylanica, G. Don 641
Cathcartia, *H. f.* 119
villosa, *H. f.* 119
Cavallium urens, Schott & Endl. 355
Ceanothus asiaticus, Lamk. 642
capsularis, Forst. 642
circumscissa, Gærtn. 641
paniculatus, Roth. 617
Wightiana, Wall. 639
zeylanica, Heyne 641
Cedrela, *Linn.* 568
australis, F. Muell. 569
febrifuga, Bl. 568
hexandra, Wall. 568
? *longifolia*, Wall. 568
? *multijuga*, Kurz 569
? *odorata*, Hort. Kew. 568
serrata, Royle 568
Toona, *Roxb.* 568
? *velutina*, DC. 568
? *villosa*, Roxb. 568
CEDRELEÆ 541
Ceiba pentandra, Gærtn. 350
CELASTREÆ 606
Celastrinea ? 614
CELASTRINEÆ 606
Celastrus, *Linn.* 617
acuminatus, Wall. 570
alnifolia, Don 617
attenuata, Wall. 619
bivalvis, Jack. 614
buxifolia, Roxb. 621
crenatus, Roth. 621
crenulata, *Wall.* 618
dependens, Wall. 617
emarginata, W. & A. 621
Finlaysoniana, *Wall.* 618
glaucus, Vahl 623
Heyneana, Roth. 620
Hindsii, Benth. 618
Jackianus, Steud. 618
lucida, *Wall.* 618
Metziana, Turcz. 617
micrantha, *Roxb.* 618
monosperma, *Roxb.* 618
montana, W. & A. 621
multiflora, Roxb. 617
neglecta, Wall. 619
nutans, Roxb. 617
obtusifolia, Roxb. 618

Page
opposita, Wall. 617
ovata, Wall. 619
oxyphylla, Wall. 619
pallida, Wall. 621
paniculata, *Willd.* 617
pauciflora, *Wall.* 618
racemosa, *Wall.* 618
rigida, Wall. 621
robustus, Roxb. 622
Rothiana, Rœm. & Schultz 617, 620
Royleana, Wall. 620
rufa, Wall. 620
? *senegalensis*, Lamk. 621
serrulata, Roth. 620
spinosus, Royle 620
stylosa, *Wall.* 618
trigyna, *Lamk.* 618
venulosa, *Wall.* 618
verticillata, Roxb. 199, 618
Wallichiana, W. & A. 620, 621
? ? *Wightiana*, Wall. 617
zeylanica. Roth. 641
Celosia corymbosa, Willd. 245
Cerastium, *Linn.* 227
aquaticum, Linn. 229
cordifolium, Roxb. 244
dahuricum, *Fisch.* 227
glomeratum, Thuill. 228
grandiflorum, Don 228
indicum, *W. & A.* 227
membranaceum, Jac. 228
napalense, Wall. 228
Thomsoni, *H.f.* 228
trigynum, *Villars* 227
triviale, Link. 228
vulgatum, *Linn.* 228
Ceratocephalus falcatus, Pers. 16
orthoceras, DC. 16
Chailletia, *DC.* 570
Brunoniana, Wall. 570
deflexifolia, *Turcz.* 571
edulis, Kurz 594
gelonioides, *H.f.* 570
Griffithii, *H.f.* 571
Helferiana, *Kurz* 570
Laurocerasus, *Planch.* 572
longipetala, *Turcz.* 571
sumatrana, Miq. 570
CHAILLETIACEÆ 569
Chalcas intermedia, Rœm. 502
paniculata, Rœm. 502
paniculata, Linn. 503

Page
sumatrana, Rœm. 503
Chamæbuxus arillata, Hassk. 200
paniculata, Hassk. 200
Chartacalyx, *Maing.* 382
accrescens, *Mast.* 382
Chaulmoogra odorata, Roxb. 195
Cheiranthus, *Linn.* 132
albiflorus, *T. And.* 133
Cheirii, Linn. 132
Farsetia, Wall. 140
himalaicus, *H.f. & T.* 132
himalayensis, *Camb.* 132
parryoides, *Kurz* 132
Stewartii, *T. And.* 132
Cherleria grandiflora, Don 239
juniperina, Don 239
Chickrassia, *Juss.* 567
Nimmonii, Grah. 568
tabularis, *Juss.* 568
trilocularis, Rœm. 568
velutina, Rœm. 568
Chilmoria dodecandra, Ham. 195
Chilocalyx ellipticus, Turcz. 513
Chionotria monogyna, Walp. 500
? *rigida*, Jack. 500
Chisocheton, *Bl.* 550
? costatus, *Hiern* 552
dysoxyfolius, *Kurz* 551
erythrocarpus, *Hiern* 550
fragrans, *Hiern* 551
glomeratus, *Hiern* 551
grandiflorus, *Kurz* 552
holocalyx, *Hiern* 551
paniculatus, *Hiern* 552
penduliflorus, *Planch.* 550
spicatus, *Hiern* 550
Chloroxylon, *DC.* 569
Dupada, Buch. 528
Swietenia, *DC.* 569
Chorispora, *DC.* 166
elegans, Camb. 167
sibirica, *DC.* 167
sabulosa, *Camb.* 167
tenella, *DC.* 166
Christolea, *Camb.* 154
crassifolia, *Camb.* 154
Chrysocyathus, Falc. 15
Cimicifuga, *Linn.* 29
fœtida, *Linn.* 30
frigida, Royle 30
Cipadessa, *Bl.* 545

Page
baccifera, Miq. 545
fruticosa, *Bl.* 545
? *subscandens*, Miq. 545
Cissampelos, *Linn.* 103
barbata, Wall. 104
cuapeba. Linn. 104
convolvulacea. Willd. 104
delicatula, Miers 104
discolor, DC. 103
discolor, Buch. 104
discolor, Wall. 104
diversa, Miers 104
elata, Miers 104
eriantha, Miers 104
glabra, Roxb. 103
grallatoria, Miers 104
hernandifolia, Willd. 103, 104
hexandra, Roxb. 103
hirsuta, Buch. 104
mauritiana, Wall. 102
obtecta, Wall. 104
officinarum, Pluk. 105
oleracea, Wall. 96
orbiculata, Buch. 104
ovata, Poir. 105
Pareira, *Linn.* 103
Plukenetii, DC. 105
sagittata, Ham. 96
subpeltata, Thw. 104
Wightianus, Wall. 105
CISSAMPELIDEÆ 95
Cissus acida, Wall. 654
acida, Roxb. 654
acuminata, Thw. 648
acutifolia, Poir. 663
adnata, Roxb. 649
angulata, Lamk. 649
angustifolia, Roxb. 654
aquosa, Wall. 648
assimilis. Kurz 660
auriculata, Roxb. 654
auriculata, DC. 658
cantoniensis, Hk. & A. 663
capriolata, Royle 659
carnosa, Roxb. 654
cinerea, Lamk. 654
cordata, Roxb. 646, 648
cordata, Wall. 649
crenata, Vahl 654
cymosa, Wall. 660
discolor, Bl. 647
diversifolia, Walp. 663
edulis, Dalz. 645
elongata, Roxb. 658
feminea, Roxb. 655, 660
glauca, Thw. 647
glauca, Roxb. 648

Page
glyptocarpa, Thw. . 645
hastata, Miq. . . 645
heptaphylla, Retz. . 662
heterophylla, Herb. Madr. 653
himalayana, Walp. . 656
involucrata, Spr. . 664
japonica, Willd. . 660
Kleinii, Wall. . . 649
lanceolaria, DC. . 660
latifolia, Vahl . . 649
lonchiphylla, Thw. . 646
muricata, Dalz. & Gibs. 660
napaulensis, DC. . 659
obtusifolia, Lamk. . 654
pedata, Lamk. . . 662
pentagona, Roxb. . 646
pentaphylla, Hb. Madr. . . . 649
purpureus, Roxb. . 648
quadrangularis, Linn. 645
repanda, Vahl . . 648
repens, Lamk. . . 647
repens, Thw. . . . 648
riparia, Wall. . . 649
rotundiatia, Heyne . 647
semicordata, Wall. . 656
setosa, Roxb. . . . 654
serratifolia, Hb. Rottl. 662
serrulata, Roxb. . 659
spicifera, Griff. . . 650
tenuifolia, Heyne . 660
trifoliata, Hb. Ham. 654
trilobata, Lamk. . 653
truncata, Wall. . . 660
velutinus, Lind. . . 647
vitiginea, Linn. . . 649
vitiginea, Roxb. 648, 651
Wallichiana, Turcz. 663
Citrus, *Linn.* . . . 514
acida, Roxb. . . . 515
Aurantium, *Linn.* . 515
buxifolia, Poir . . 515
decumana, *Linn.* . 516
Hystrix, *DC.* . . . 515
inermis, Roxb. . . 514
japonica, *Thunb.* . 514
latipes, H. f. & T. . 515
Limetta, Risso . . 515
Limetta, DC. . . 515
Limonellus, Wall. . 515
Limonum, Wall. . 515
Lumia, Risso . . 515
medica, *Linn.* . . 514
medica, Willd. . . 515
Papeda, Miq. . . 515

Page
scandens, Griff. . . 510
vulgaris, Risso . . 515
Clausena, *Burm.* . . 503
excavata, *Burm.* . 504
heptaphylla, *W.&A.* 504
indica, *Oliv.* . . . 505
macrophylla, *Hk. f.* 504
nana, W. & A. . . 506
pentaphylla, *DC.* . 503
pubescens, W. & A. 506
simplicifolia, Dalz. 498
suffruticosa, *W.&A.* 506
Wallichii, *Oliv.* . . 505
Wampi, *Blanco* . . 505
Willdenovii, *W.&A.* 506
CLEMATIDEÆ . . . 1
Clematis, *Linn.* . . 2
acuminata, *DC.* . . 5
acutangula, *H.f.&T.* 3
albida, *Klotzsch* . . 5
amplexicaulis, Edgw. 6
anemonidora, *Don* . 2
apiculata, *H.f.&T.* 4
barbellata, *Edgw.* . 3
Buchananiana, *DC.* 6
Buchananiana, Wall. 6
Cadmia, *Ham.* . . 2
cana, Wall. . . . 4
comosa, *DC.* . . . 6
connata, *DC.* . . 6
glauca, Willd. . . 5
globosa, Royle . . 5
Gouriana, *Hook.* . . 4
gracilis, Edgw. . . 6
grata, *Wall.* . . . 3
graveolens, *Lindl.* . 4
graveolens, Hook. . 5
grewiæflora, *DC.* . 6
grossa, *Wall.* . . . 6
hedysarifolia, *DC.* . 4
Ispahanica, Boiss. . 5
Javana, DC. . . . 4
loasæfolia, *DC.* . . 6
loasifolia, *Don* . . 6
longicaudata, Ledeb. 5
montana, *Ham.* . . 2
montana, Don . . 2
Munroana, Wight . 3
Napaulensis, *DC.* . 2
nepaulensis, Royle . 3
nutans, *Royle* . . 5
orientalis, *Linn.* . . 5
parvifolia, H. f.&T. 4
parvifolia, Edgw. . 5
puberula, *H. f. &T.* 4
Punduana, Wall. . 2
scabiosæfolia, *DC.* . 6
smilacifolia, *Wall.* . 3

Page
smilacina, Bl. . . 3
subpeltata, Wall. . 3
sulcata, Wall. . . 2
tenuifolia, Royle . 5
tortuosa, Wall. . . 6
triloba, *Heyne.* . . 3
velutina, Edgw. . . 6
venosa, Royle . . 6
villosa, *DC.* . . . 6
vitifolia, Wall. . . 6
Wightiana, *Wall.* . 5
Cleome, *Linn.* . . . 168
angustifolia, A.Rich. 169
aspera, *Kœnig.* . 169
brachycarpa, *Vahl* . 169
Burmanni, *W. & A.* 170
Chelidonii, *Linn.* . 170
ciliata, Sch. & Th. . 170
cordata, DC. . . . 168
diffusa, Roxb. . . 169
diversifolia, Hochst. 169
felina, *Linn.* . . . 170
fruticosa, Linn. . . 172
gracilis, Edgw. . . 168
heptaphylla, Linn. . 168
icosandra, Linn. . 170
monophylla, *Linn.* . 168
monophylla, Law. . 169
Noreana, Boiss. . . 168
papillosa, *Steud.* . 168
pentaphylla, Linn. . 171
quinquenervia, *DC.* . 168
Ruta, Camb. . . 169
simplicifolia, *H. f. & T.* 169
Stocksiana, *Boiss.* . 169
tenella, *Linn.* . . 169
Vahliana, Fres. . 169
viscosa, *Linn.* . . 170
CLEOMEÆ 168
Clerodendron sericeum, Wall. 419
Cleyera, *DC.* . . . 283
emarginata, Gardn. 281
grandiflora, *H.f.&T.* 284
grandiflora, Wall. 281, 282, 284
grandiflora, Chois. . 284
gymnanthera, W. & A. 281
japonica, Thunb. . 280
lasiopetala, Wight . 283
Lushia, G. Don . . 284
ochnacea, *DC.* . . 283
ochnoides, G. Don . 284
pentapetala, Spr. . 287
Wallichiana, Sieb. & Zucc. 284

Page
Clypea Burmanni, W. & A. 104
Cocculeæ 95
Cocculus, *DC.* 101
  acuminatus, DC. . 99
  aristolochiæ, DC. . 101
  Blumeanus, Wall. . 99
  Burmanni, DC. . . 104
  calophyllus, Wall. . 578
  convolvulaceus, DC. 97
  cordifolius, DC. . 97
  crispus, DC. . . . 96
  cuspidatus, Wall. . 100
  Fibraurea, DC. . . 98
  Finlaysonianus, Wall. 103
  glabra, W. & A.. . 102
  hastatus, DC. . . 101
  incanus, Colebr. . 102
  lacunosus, DC. . . 98
  lævis, Wall. . . . 102
  laurifolius, *DC.* . . 101
  Leæba, *DC.* . . . 102
  lucidus, Teysm. & Benn. 106
  macrocarpus, *W.&A.* 101
  malabaricus, DC. . 96
  membranaceus, Wall. 104
  mollis, *Wall.* . . 102
  oblongus, Wall. . . 100
  orbiculatus, DC. . . 104
  peltatus, DC. . . 104
  petiolaris, Wall. . . 97
  planiflorus, Wall. . 106
  pleniflorus, Wall. . 106
  polycarpus. Wall. . 99
  populifolius, DC. . 98
  radiatus, DC. . . 99
  recisus, Miers . . 102
  Rorburghianus, Wall. 103
  sepium, Colebr. . . 101
  suberosus, DC. . . 98
  tomentosus, Colebr. . 96
  triandrus, Colebr. . 100
  velutinus, Wall. . . 100
  verrucosus, Wall. 96, 97
  villosus, *DC.* . . . 101
  villosus, Wall. . . 104
Cochlearia, *Linn.* . . 145
  alyssoides, DC. . . 145
  flava, *Ham.* . . . 145
  himalaica, *H.f. & T.* 145
  scapiflora, *H.f. & T.* 145
Cochlospermum, *Kunth.* 189
  Gossypium, *DC.* . . 190
Cœlostegia, *Benth.* . . 352
  Griffithii, *Benth.* . 353
Colbertia obovata, Bl. 37

Page
  angusta, Wall. . . 38
  Coromandeliana, DC. 38
  floribunda, Wall. . 38
Colubrina, *Rich.* . . 642
  asiatica, *Brongn.* . 642
  javanica, Miq. . . 642
  pubescens, *Kurz* . 642
  travancorica, *Bedd.* 643
Columbia, *Pers.* . . 393
  floribunda, *Wall.* . 393
  merguensis, *Planch.* 394
Commersonia, *Forsk.* . 378
  echinata, Bl. . . 378
  herbacea; G. Don . 376
  javensis, G. Don . 378
  platyphylla, *Andrews* 378
Conghas zeylonensis, Hb. Madr. . . . 681
Connaropsis, *Planch.* . 439
  diversifolia, Kurz . 440
  Griffithii, *Planch.* . 440
  monophylla, *Planch.* 440
Connarus ? Jackianus, Wall. 678
Conringia, *Reichb.* . . 152
  planisiliqua, *Fisch. & Mey.* 152
  Thaliana, Reichb. . 148
Cookia dulcis, Bedd. . 506
  graveolens, W. & A. 505
  ? *macrophylla*, Lindl. 504
  punctata, Sonn. . 505
  punctata, Hassk. . 502
Coptis, *Salisb.* . . . 22
  Teeta, *Wall.* . . . 23
Corchorus, *Linn.* . . 396
  acutangulus, *Lamk.* 398
  æstuars, Hb. Madr. 398
  æstuans ? Ham. . . 398
  Antichorus, *Ræusch.* 398
  Burmanni, DC. . . 398
  capsularis, *Linn.* . 397
  decemangularis, Rox. 397
  fascicularis, *Lamk.* . 398
  fuscus, Roxb. . . 398
  humilis, Munro . . 398
  linearis, Wall. . . 398
  Marua, Ham. . . 397
  olitorius, *Linn.* . . 397
  olitorius, Wall. . . 397
  pumilus, *Ham.* . . 399
  subscandens, Wall. . 398
  tridens, *Linn.* . . 398
  trilocularis, *Linn.* . 397
  trilocularis, Burm. . 398
  urticæfolius, W. & A. 397
Corydalis, *DC.* . . . 121

Page
  adiantifolia, *H.f. & T.* 127
  astragalina, H. f. & T. 126
  cachemiriana, *Royle* 123
  chærophylla, *DC.* . 126
  cornuta, *Royle* . . 126
  crassifolia, *Royle* . 127
  crassissima, Camb. . 127
  crithmifolia, Royle . 123
  debilis, Edgw. . . 126
  diphylla, Wall. . . 122
  elegans, *Wall.* . . 124
  epithymifolia, Walp. 123
  Falconeri, *H. f. & T.* 124
  filiformis, Royle . . 125
  flabellata, *Edgw.* . 127
  flaccida, *H. f. & T.* . 122
  geraniifolia, H. f. & T. 126
  Gortschakovii, *Schr.* 125
  Govaniana, *Wall.* . 124
  Griffithii, Boiss. . . 123
  Hamiltoniana. Don 123
  Hoffmeisteri. Klotz. 127
  Impatiens, Fisch. . 125
  juncea, *Wall.* . . 123
  latiflora, *H. f. & T.* 126
  leptocarpa, *H. f. & T.* 122
  longipes, DC. . . 125
  longipes, Don. . . 122
  meifolia, *Wall.* . . 126
  Moorcroftiana, *Wall.* 125
  ophiocarpa, *H. f. & T.* 122
  pauciflora, Edgw. . 122
  physocarpa, Camb. . 127
  polygalina, *H. f. & T.* 123
  ramosa, *Wall.* . . 125
  rutæfolia, *Sibth.* . . 122
  sibirica, *Pers.* . . 125
  stricta, *Stephan* . . 126
  tibetica, H. f. & T. . 124
  verticillaris, DC. . 123
Corynandra pulchella, Schrad. . . . 170
Coscinium, *Colebr.* . . 98
  Blumeanum, *Miers* . 99
  fenestratum, *Colebr.* 99
  Wallichianum, Miers 99
  Wightianum, Miers 99
Crambe, *Tourn.* . . 165
  cordifolia, *Stev.* . . 165
  Kotschyana, Boiss. . 165
Cratæva, *Linn.* . . . 172
  apetala, *Spr.* . . 171
  Marmelos, Linn. . . 517
  Nurvala, Ham. . . 172

Page
  odora, Ham. 172
  religiosa, *Forst.* 172
  religiosa, Ham. 172
  religiosa, Ainslie 517
  Roxburghii, Br. 172
  unilocularis, Ham. 172
  Vallanga, Kœnig 516
CRATOXYLEÆ 252
Cratoxylon, *Bl.* 257
  arborescens, *Bl.* 258
  **biflorum*, Turcz. 257
  formosum, *B. & Hk.* 258
  lanceolatum, Miq. 257
  Maingayi, *Dyer* 258
  neriifolium, *Kurz* 257
  polyanthum, *Korth.* 257
  prunifolium, *Dyer* 258
Ctenolophon, *Oliv.* 577
  grandifolius, *Oliv.* 577
  parvifolius, *Oliv.* 577
CRUCIFERÆ 128
Cucubalus, *Linn.* 221
  bacciferus, *Linn.* 222
  Behen, Linn. 218
Cullenia, *Wight* 350
  excelsa, *Wight* 350
Cupania, *Plum.* 676
  acuta, *Hiern* 677
  adenophylla, *Planch.* 677
  canescens, Pers. 671, 679
  fascidula, *Kurz* 677
  glabrata, *Kurz* 676
  Helferi, *Hiern* 679
  Jackiana, *Hiern* 678
  Lessertiana, *Camb.* 678
  Mischocarpus, Steud. 678
  pallidnea, *Hiern* 676
  pentapetala, *W. & A.* 678
  pentaphylla, Wight 678
  pleuropteris, *Bl.* 677
  Roxburghii, Wight 678
  sumatrana, *Miq.* 678
Cussambium glabrum, Ham. 681
  pubescens, Ham. 681
  spinosum, Ham. 681
Cyamus mysticus, Salisb. 116
  Nelumbo, Sm. 116
Cyathocalyx, *Champ.* 53
  ? Maingayi, *H.f. & T.* 53
  martabanicus, *H.f. & T.* 53
  zeylanicus, *Champ.* 53
Cyathostemma, *Griff.* 57
  viridiflorum, *Griff.* 57
Cyclea, *Arn.* 104
  Arnottii, Miers 104
  barbata, Miers 104
  Burmanni, *Miers* 104
  debiliflora, Miers 104
  laxiflora, Miers 104
  peltata, *H.f. & T.* 104
  populifolia, H.f. & T. 105
  versicolor, Miers 104
Cyminosma Ankenda, Gærtn. 498
  pedunculata, DC. 498

Dactylicapnos thalictrifolia, Wall. 121
Dalrympelia pomifera, Roxb. 699
Decaisnea, *H. f. & T.* 107
  insignis, *H. f. & T.* 107
Decaschistia, *W. & A.* 332
  crotonifolia, *W. & A.* 332
  trilobata, *Wight* 332
Delima, *Linn.* 31
  hebecarpa, DC. 31
  intermedia, Bl. 31
  sarmentosa, *Linn.* 31
DELIMEÆ 30
Delphinium, *Linn.* 24
  Ajacis, Linn. 27
  altissimum, *Wall.* 26
  Brunonianum, *Royle* 27
  cæruleum, *Jacq.* 25
  Cashmirianum, *Royle* 26
  dasycaulon, *Fres.* 25
  denudatum, *Wall.* 25
  elatum, *Linn.* 26
  glaciale, *H.f. & T.* 27
  Hoffmeisteri, Klotzsch 26
  incanum, *Royle* 25
  incisum, Wall. 26
  Jacquemontianum, Camb. 26, 27
  moschatum, Munro 27
  pauciflorum, Don 27
  pauciflorum, Royle 25
  penicillatum, H.f.&T. 24
  pyramidale, Royle 26
  ranunculifolium, Wall. 26
  rectivenium, Royle 26
  saniculæfolium, *Boiss.* 25
  scabriflorum, Don 27
  uncinatum, *H.f. & T.* 24
  vestitum, *Wall.* 26
  vestitum, Boiss. 24
  viscosum, *H. f. & T.* 27
Dentaria dasyloba, Turcz. 139
Desmocarpus missionis, Wall. 172
DIANTHEÆ 212
Dianthus, *Linn.* 213
  anatolicus, *Boiss.* 214
  angulatus, *Royle* 215
  barbatus, Linn. 215
  cachemiricus, *Edgw.* 214
  Caryophyllus, *Linn.* 214
  caucasicus, Sims 215
  chinensis, Linn. 213
  crinitus, *Sm.* 215
  deltoides, *Linn.* 214
  Falconeri, *Edgw.* 214
  fimbriatus, *Biebr.* 215
  glaucus, Ham. 213
  incertus, Jacq. 215
  Jacquemontii, *Edgw.* 214
  Seguieri, *Vill.* 215
Dicellostyles, *Benth.* 333
  axillaris, *Benth.* 333
  jujubifolia, *Benth.* 333
Dicentra, *Borkh.* 120
  Roylei, *H. f. & T.* 121
  scandens, *Walp.* 121
  thalictrifolia, *H. f. & T.* 121
  torulosa, *H. f. & T.* 121
Dicranostigma lactucoides, H. f. & T. 119
Dictamnus, *Linn.* 487
  albus, *Linn.* 487
  Fraxinella, Pers. 487
  himalayanus, Royle 487
Dictyocarpus truncatus, Wight 322
Didymococcus Danura, Bl. 684
  verticillatus, Bl. 684
Dielytra scandens, Don 121
Dipetalum biloculare, Dalz. 497
Diploclisia inclyta, Miers 101
  lepida, Miers 101
  macrocarpa, Miers 101
  pictinervis, Miers 101
Diplodon cerastioides, Reichb. 227
Diplotaxis, *DC.* 157

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* Quotation omitted p. 257 : C. biflorum, Turcz. Bull. Mosc. 1863, i. 580. Hypericum, Wall. Cat. 4820.

Page
Griffithii, *H. f. & T.* 157
grandiflora, Wall. 552
Dipterygium, *Dcne.* 164
glaucum, *Dcne.* 164
DIPTEROCARPEÆ 294
Dipterocarpus, *Gærtn.f.* 295
alatus, *Roxb.* 298
alatus, A. DC. 297
angustifolius, W.&A. 299
Baudii, Korth. 296
cordatus, Wall. 297
cornutus, *Dyer* 296
costatus, Roxb. 299
costatus, Gærtn. f. 298
crinitus, *Dyer* 296
glandulosus, *Thw.* 297
gonopterus, Turcz. 298
grandiflora, Wall. 297
grandiflorus, Griff. 299
grandifolius, Teysm. 297
Giffithii, *Miq.* 299
hispidus, *Thw.* 296
incanus, *Roxb.* 298
indicus, Bedd. 295
insignis, *Thw.* 298
lævis, Ham. 295
oblongifolius, Thw. 296
oblongus, DC. 296
obtusifolius, *Teysm.* 295
pilosus, *Roxb.* 296
pterygocalyx, *Scheff.* 298
scaber, *Ham.* 297
scabridus, *Thw.* 298
tuberculatus, *Roxb.* 297
turbinatus, *Gærtn. f.* 295
vestitus, *Wall.* 295
zeylanicus, *Thw.* 297
Dipterosperma 291
Dillenia, *Linn.* 36
angusta, Roxb. 38
aurea, *Sm.* 37
bracteata, *Wight* 37
dentata, Thunb. 36
elliptica, Thunb. 36
floribunda, *H. f. & T.* 38
grandifolia, *Wall.* 38
indica, *Linn.* 36
integra, Thunb. 37
meliosmæfolia, *H. f. & T.* 36
ornata, Wall. 37
ovata, *Wall.* 36
parviflora, *Griff.* 38
pentagyna, *Roxb.* 38
pilosa, Ham. 38
pilosa, Roxb. 38
pulcherrima, *Kurz* 37
repanda, Roxb. 37

Page
retusa, *Thunb.* 37
scabrella, *Roxb.* 38
speciosa, Thunb. 36
speciosa, Griff. 37
DILLENIACEÆ 30
DILLENIEÆ 31
Dilophia, *Thoms.* 160
salsa, *Thoms.* 161
Dimocarpus, Wall. 555
crinita, Lour. 687
Lichi, Lour. 687
hougan, Lour. 689
pupilla, Moon 689
undulatus, Wight 689
verticillata, Hb. Roxb. 684
Diœcia pentandra, Wall. 586
Dioscorea sativa, Linn. 597
Diospyros cerasifolia, Don 285
? *frondosa*, Wall. 92
serrata, Don 285
Discostigma fabrile, Miq. 260
merguense, Planch. & Tr. 267
zeylanicum, Planch. & Tr. 268
Dittelasma, *H. f.* 671
Rarak, *H. f.* 672
Diuroglossum rufescens, Turcz. 375
Dobinea, *Ham.* 696
vulgaris, *Ham.* 696
Dodonæa, *Linn.* 697
angustifolia, Linn.f. 697
arabica, Hochst. & Steud. 697
Burmanniana, DC. 697
dioica, Roxb. 697
heterophylla, Hort. 697
microcarpa, DC. 697
pallida, Miq. 697
pentandra, Griff. 697
spathulata, Sm. 697
viscosa, *Linn.* 697
Wightiana, DC. 697
DOMBEYEÆ 353
Doona, *Thw.* 311
affinis, *Thw.* 311
congestiflora, *Thw.* 312
cordifolia, *Thw.* 312
Gardneri, *Thw.* 312
macrophylla, *Thw.* 312
nervosa, *Thw.* 311
ovalifolia, *Thw.* 312
trapezifolia, *Thw.* 311

Page
venulosa, *Thw.* 313
zeylanica, *Thw.* 311
Doryctandra Roxburghii, Hassk. 186
Douepia tortuosa, Camb. 158
Draba, *Linn.* 141
Adamsii, Ledeb. 142
algida, Adams 142
alpicola, Klotzsch 142
alpina, *Linn.* 142
altaica, Bunge 143
androsacea, Willd. 143
confusa, Ehrh. 143
elata, *H. f. & T.* 142
elegans, Boiss. 142
ellipsoidea, *H.f.&T.* 144
fladnitzensis, *Wulf.* 143
glacialis, *Adams* 142
glomerata, Royle 143
gracilis, Ledeb. 143
gracillima, H.f.& T. 144
helvetica, Schleich. 143
himalayensis, Klotzsch 143
incana, *Linn.* 143
incompta, *Stev.* 142
lactea, Kar & Kir. 143
lapponica, Wahl 143
lasiophylla, *Royle* 143
linearis, *Boiss.* 144
muralis, *Linn.* 144
ochroleuca, Bunge 142
polytricha, Ledeb. 142
pygmea, Turcz. 143
radicans, Royle 142
setosa, Royle 142
stenocarpa, H. f. & T. 144
tibetica, *H.f. & T.* 143
tibetica, H. f. & T. 142
verna, Linn. 145
Wahlenbergii, Hartm. 143
Winterbottomi, H. f. & T. 142
Drepananthus, *Maing.* 56
pruniferus, *Maing.* 56
ramuliflorus, *Maing.* 56
Drymaria, *Willd.* 244
cordata, *Willd.* 244
extensa, Wall. 244
DRYPIDEÆ 212
Dryptopetalum coriaceum, Arn. 625
Dumreichera, Hochst. 334
Durio, *Linn.* 350
malaccensis, *Planch.* 351
Oxleyanus, *Griff.* 351

Page
Zibethinus, *DC.* . 351
Dysoxylon Championii, H. f. & T. . . . 562
Dysoxylum, *Bl.* . . 546
Beddomei, *Hiern* . 548
binectariferum, *H. f.* 546
brevipes, *Hiern* . 546
cauliflorum, *Hiern* . 549
cuneatum, *Hiern* . 549
flavescens, *Hiern* . 549
grande, *Hiern* . . 547
grandiflorum, Rœm. 552
Griffithii, *Hiern* . 549
Hamiltonii, *Hiern* . 548
macrocarpum, Thw. 546
Maingayi, *Hiern* . 547
malabaricum, *Bedd.* 548
multijugum, Arn. . 552
pallens, *Hiern* . . 548
paniculatum, Arn. . 552
procerum, *Hiern* . 547
thyrsoideum, *Griff.* . 547

Eccremanthus eximius, Thw. 691
Echinocarpus, *Bl.* . . 399
assamicus, *Benth.* . 399
dasycarpus, *Benth.* . 400
Murex, *Benth.* . . 399
sterculiaceus, *Benth.* 400
tomentosus, *Benth.* . 400
Ehretia umbellulata, Wall. 604
Ekebergia indica, Roxb. 545
? *integerrima*, Wall. 545
Elæodendron, *Jacq. f.* . 623
glaucum, *Pers.* . . 623
nilghirense, Wall. . 614
oxyodon, Turcz. . 623
paniculatum, W. & A. 623
Roxburghii, W. & A. 623
Elæocarpus, *Linn.* . 400
Acronodia, *Mast.* . 408
acuminatus, *Wall.* . 406
adenophyllus, Wall. 403
amœnus, *Thw.* . . 404
amygdalinus, Wall. 402
? *angustifolius*, Wight 403
apiculatus, *Mast.* . 407
aristatus, *Roxb.* . . 405
aristatus, Wall. . . 402
bracteatus, *Kurz* . 406
ceylanicus, *Arn.* . . 406
chackroula, Ham. . 408
copalliferus, Retz. . 313
coriaceus, Hook. . 404
cuneatus, *Wight* . 402
cyanocarpa, *Maing.* 406

Page
ferrugineus, *Wight* . 406
? *Finlaysonianus,* Wall. 407
floribundus, *Bl.* . . 401
Ganitrus, *Roxb.* . . 400
glabrescens, *Mast.* . 403
glandulifer, *Mast.* . 406
glandulosus, Wall. . 403
Griffithii, *Mast.* . . 408
grossa, Wall. . . . 401
Helferi, *Kurz* . . 402
integra, *Wall.* . . 408
integrifolius, Lamk. 401
Jackianus, Wall. . 409
? *lacunosus*, Wall. 401, 402
lanceæfolius, *Roxb.* . 402
lanceolata, Wall. . 402
leptostachya, *Wall.* . 403
Lobbianus, Turcz. . 401
longifolius, Wall. . 409
lucidus, *Roxb.* . . 403
monoceroides, Wight 409
Monocera, *Cav.* . . 405
montanus, *Thw.* . . 404
Munroii, *Mast.* . . 407
nitidus, *Jacq.* . . 401
oblonga, Wall. . . 402
oblongus, *Gærtn.* . 403
oblongus, Wall. . . 401
obovatus, *Arn.* . . 404
ovalifolius, Wall. . 402
paniculatus, *Wall.* . 407
parvifolius, *Wall.* . 401
pedunculatus, *Wall.* 408
Perim-Kara, DC. . 403
Pirincara, Wall. . 401
polystachyus, *Wall.* 403
prunifolius, *Wall.* . 407
pubescens, Hook. . 404
punctatus, *Wall.* . 405
robustus, *Roxb.* . 402
? *robustus*, Wall. . . 408
rugosus, *Roxb.* . . 405
rugosus, Wall. . . 405
serratus, *Linn.* . . 401
serratus, Roxb. . . 401
serratus, Wall. . . 402
serratus, Heyne . . 403
serrulatus, Roxb. . 405
sikkimensis, *Mast.* . 402
stipularis, *Bl.* . . 404
subvillosus, *Arn.* . 404
tuberculatus, *Roxb.* 404
Varunua, *Ham.* . . 407
? *venustus*, Bedd. . . 405
Elatine, *Linn.* . . . 250
æstivosa, Wight . 251
ambigua, *Wight* . 251

Page
americana, *Arn.* . 250
ammannioides, W. & A. 251
verticillata, *W. & A.* 252
ELATINEÆ 250
Ellepeia, *H. f. & T.* . 52
cuneifolia, *H. f. & T.* 52
ferruginea, *H. f. & T.* 52
glabra, *H. f. & T.* . 52
nervosa, *H. f. & T.* 52
Elodea formosa, Jack. 258
Embamma cordigera, Griff. 664
heterantha, Griff. . 664
Epicharis exarillata, Arn. 546
exarillata, Nimmo. 561
mollis, Wall. . . 548
Epimedium, *Linn.* . . 112
elatum, *Morr. & Dcne.* 112
Erebennus canaranus, Alef. 341
Erinocarpus, *Nimmo.* . 394
Nimmoanus, *Grah.* . 394
Eriodendron, *DC.* . 349
anfractuosum, *DC.* . 350
orientale, Spr. . . 350
Erioglossum, *Bl.* . . 672
edule, *Bl* . . . 672
rubiginosum, Brand. 672
Eriolæna, *DC.* . . . 370
Candollei, *Wall.* . 370
Hookeriana, *W. & A.* 370
quinquelocularis, *Wight* 371
spectabilis, *Planch.* . 371
Stocksii, *H. f. & T.* 370
Wallichii, *DC.* . . 370
ERIOLÆNEÆ 353
Erodium, *L'Hérit* . . 433
Chumbalense, Munro, 427
ciconium, *Willd.* . 434
cicutarium, *Leman* . 434
himalayanum, Royle 434
malacoides, *Willd.* . 435
nilagiricum, Schlecht 435
Stephanianum, *Willd.* 434
stipaceum, *Edgw.* . 435
tibetanum, *Edgw.* . 434
violæfolium, Turcz. 435
Erophila, *DC.* . . . 144
vulgaris, *DC.* . . 145
Eruca, *Tourn.* . . . 158
Sativa, *Lamk.* . . 158
Erysimum, *Linn.* . . 152
Alliara, Linn. . . 151
altaicum, *C. A. Mey.* 154

Page

deflexum, *H. f. & T.* 153
funiculosum, *H. f. & T.* 153
gracile, Gay 153
Griffithii, Boiss. 153
hieraciifolium, *Linn.* 153
odoratum, *Ehrh.* 154
longisiliquum, *H. f. & T.* 154
pachycarpum, *H. f. & T.* 153
patens, Gay 153
repandum, *Linn.* 153
robustum, Don 153
strictum, Gærtn. 153
Thomsoni, *H. f.* 154
Erythrochiton Wallichianum, Griff. 281
Erythropalum, *Bl.* 578
populifolium, *Mast.* 578
scandens, *Bl.* 578
vagum, *Mast.* 578
Erythropsis Roxburghiana, Schott. & Endl. 360
Erythrospermum, *Lam.* 191
phytolaccoides, *Gard.* 191
ERXTHROXYLEÆ 410
Erythroxylon, *Linn.* 414
burmanicum, *Griff.* 414
indicum, Bedd. 414
Kunthianum, *Wall.* 414
lanceolatum, *Wight* 415
lucidum, *Moon* 415
monogynum, *Roxb.* 414
obtusifolium, *Thw.* 415
retusum, Bauer. 415
sideroxyloides, *Lam.* 415
sumatranum, Miq. 415
Euclidium, *Br.* 164
syriacum, *Br.* 165
EULINEÆ 410
Euonymus, *Linn* 607
acutangulus, Wight 610
angulatus, *Wight* 610
atropurpureus, Rox. 612
attenuatus, *Wall.* 610
bullatus, *Wall.* 610
calocarpus, *Kurz* 609
capillaceus, *Wall.* 614
cinereus, *Laws* 611
crenulatus, *Wall.* 608
dichotomus, *Heyne* 609
echinatus, *Wall.* 611
filiformis, Wall. 614
fimbriatus, *Wall.* 611
frigidus, *Wall.* 611
garcinifolius, Roxb. 614

Page

glaber, *Roxb.* 609
glaucus, Turcz. 610
Goughii, Wight 608
grandiflorus, *Wall.* 608
Griffithii, *Kurz.* 611
grossa, Wall 623
Hamiltonianus, *Wall.* 612
indicus, *Heyne* 608
japonicus, Wall. 612
javanicus. *Bl.* 607
lacerus, Ham. 608
? *læta*, Wall. 614
lucidus, Don 612
? *micranthus* Don 611
nitidus, *Benth.* 610
ovata, Wall. 615
paniculatus, *Hb. Wight* 609
pendulus, *Wall.* 612
pterocladus, Hohen. 610
punctatus, *Wall.* 610
revolutus, *Wight* 608
scandens, Grah. 611
serratifolius, *Bedd.* 609
? *serrulata*, Wall. 609
Sphærocarpus, Hassk. 607
sumatranus, Miq. 607
theæfolius, *Wall.* 612
Thwaitesii, *Laws* 608
timorensis, *Zipp.* 610
Tina, Ham. 623
tingens, *Wall.* 610
vagans, *Wall.* 611
vagans, Wall. 611
Walkerii, *Wight* 608
zeylanicus, Moon 608
Euphora exstipulatis, Griff. 557
Euphoria attenuata, Planch. 684
Danura, Wall. 684
fuscata, Benth. & H. f 682
Gardneri, Benth. & H. f. 690
glabra, Bl. 687
Litchi, Juss. 688
Litchi, Wall. 690
Longana, Bl. 686
Longana, Lamk. 690
Nephelium, DC. 687
Nephelium, Wall. 690
Noronhiana, Bl. 686
punicea, Lamk. 687
pupillum, Steud. 689
rubra, Royle 684
undulata, Hb. Heyne 689
verticillata, Wall. 684

Page

xerocarpa, Bl. 686
Euptelea, *Lieb. & Zucc.* 39
pleiosperma, *H. f. & T.* 39
Eurya, *Thunb.* 284
acuminata, *DC.* 285
acuminata, Wall. 285
acuminata, Royle 285
angustifolia, Wall. 285
angustifolia, Miq. 292
bifaria, Wall. 285
ceylanica, Wight 285
chinensis, *Br.* 285
chinensis, H. f. & T. 285
coneocarpa, Korth 284
elliptica, Gard. 284
euprista, Korth 285
fasciculata, Wall. 284
fasciculata, Ham. 285
japonica, *Thunb.* 284
lasiopetala, Gardn. 283
lucida, Wall. 285
membranacea, Gardn. 285
multiflora, DC. 285
nitida, Korth. 284
parvifolia, Gardn. 285
phyllanthoides, Bl. 284
Roxburghii, Wall. 284
salicifolia, Bl. 285
serrata, Bl. 285
symplocina, *Bl.* 284
systyla, Miq. 284
trichocarpa, *Korth.* 285
trichogyna, Bl. 285
tristyla, W. & A. 284
vitiensis, A. Gray 284
Wallichiana, Planc. 285
Wightiana, Wight 284
Wightiana, Wall. 284
Euryale, *Salisb.* 115
ferox, *Salisb.* 115
indica, Planch. 115
Eurycoma, *Jack.* 521
apiculata *A. W. Benn.* 522
longifolia, *Jack.* 521
merguensis, Planch. 521
tavoyana, Wall. 521
EUSIMARUBEÆ 517
Eusynaxis barringtoniæfolia, Griff. 290
EUTHEMIDEÆ 523
Euthemis, *Jack.* 526
? elegantissima, *Wall.* 526
elegantissima, ? Wall. 525
leucocarpa, *Jack.* 526
minor, *Jack.* 526
? *pulcherrima*, Wall. 525
Eutrema, *Br.* 151
himalaicum, *H. f. & T.* 152

Page
primulæfolium, *H. f. & T.* 152
Evodia, *Forst.* 487
accedens, Miq. 489
fraxinifolia, *H. f.* 490
glabra, *Bl.* 489
glauca, Miq. 490
gracilis, Kurz 488
Lamarckiana, Benth. 488
latifolia, *DC.* 489
Marambong, Miq. 487
meliæfolia, *Benth.* 490
pedunculosa, *H. f.* 489
robusta, *H. f.* 488
Roxburghiana, *Benth.* 487
rutæcarpa, *H. f. & T.* 490
triphylla, *DC.* 488
triphylla, Bedd. 487
viticina, *Wall.* 489

Fagara ? Budrunga, Roxb. 495
Lunur-ankenda, Gærtn. 487
Rhetsa, Roxb. 495
triphylla, Roxb. 487
triphylla, Lamk. 488
Fagonia, *Linn.* 425
arabica, *Linn.* 425
Bruguieri, *DC.* 425
cretica var. Anders. 425
Echinella, Boiss. 425
montana, Miq. 425
mysorensis, Roth 425
Fagræa ? dubia, Wall. 281
Farsetia, *Desv.* 140
ægyptiaca, *Turr.* 140
Edgeworthii, H. f. & T. 141
Hamiltonii, *Royle* 140
Jacquemontii, *H. f. & T.* 140
linearis, Dcne. 140
longisiliqua, Dcne. 140
ovalis, Boiss. 141
Feronia, *Gærtn.* 516
Elephantum, *Correa* 516
pellucida, Roth 517
Fibraurea, *Lour.* 97
chloroleuca, Miers 98
fasciculata, Miers 98
tinctoria, *Lour.* 98
tinctoria, Miers 98
? *hæmatocarpa*, H. f. & T. 106

Page
Ficaria glacialis, Fisch. 21
Filicium, *Thw.* 539
decipiens, *Thw.* 539
Firmiana colorata, Br. 360
Fissistigma scandens, Griff. 80
Flacourtia, *Comm.* 191
Cataphracta, *Roxb.* 193
Cataphracta, Bl. 192
Cataphracta, Wall. 194
**cordifolia*, Roxb. 194
crenata, Wall. 191
ferox, Wall. 194
inermis, *Roxb.* 192
inermis, Wall. 190
inermis, Miq. 192
Jangomas, Miq. 193
mollis, *H. f. & T.* 192
montana, *Grah.* 192
montana, Zipp. 192
nivea, Moon 194
obcordata, Roxb. 194
? *Perottetiana*, Clos. 193
? quintuplinervis, *Turcz.* 192
Ramontchi, *L'Her.* 193
Ramontchi, Wall. 193
**rotundifolia*, Roxb. 194
Rukam, *Zoll. & Mor.* 192
sapida, Roxb. 193
sapida, Wall. 191
sepiaria, *Roxb.* 194
stigmarota, Wall. 190
sumatrana, Planch. 192
Wightiana, Wall. 194
Flacourtiacea 419
FLACOURTIEÆ 189
Flourensia cæspitosa, Camb. 243
Flueggia leucopyrus, Wight 194
Frankenia, *Linn.* 212
pulverulenta, *Linn.* 212
FRANKENIACEÆ 211
Freziera ? attenuata, Wall. 290
Fumaria, *Linn.* 127
parviflora, *Lamk.* 128
FUMARIACEÆ 120
Gærtnera laurifolia, Herb. Madr. 419
racemosa, Roxb. 418
Gallesioa pentaphylla, Rœm. 504

Page
graveolens, Rœm. 505
Ganitrus sphærica, Gærtn. 400
Garcinia, *Linn.* 259
acuminata, Planch. 264
affinis, Wall. 260, 266
affinis, W. & A. 262
Andersoni, *Hk. f.* 270
anomala, *Pl. & Tr.* 266
atro-viridis, *Griff.* 266
bancana, *Miq.* 263
Bhumicowa, Roxb. 266
Cambogia, *Desr.* 261
cambogioides, Royle 265
celebica, Desr. 261
celebica, Linn. 260
Choisyana, *Wall.* 265
conicarpa, Wight 262
cornea, *Linn.* 260
Cowa, *Roxb.* 262
echinocarpa, *Thw.* 264
elliptica, Wall. 262, 264
eugeniæfolia, Wall. 263
Gaudichaudi, Pl. & Tr. 265
Griffithii, *Anders.* 266
Gutta, Wight 264
heterandra, *Wall.* 265
indica, *Chois.* 261, 262
Kydia, Roxb. 262
Kydiana, Laness. 262
lanceæfolia, *Roxb.* 261, 263
lateriflora, Bl. 265
lobulosa, Wall. 262, 264
loniceroides, *Anders.* 264
macrophylla, Anders. 270
Maingayi, *Hk. f.* 267
malaccensis, *Hk. f.* 261
Mangostana, *Linn.* 260
merguensis, *Wight* 267
Morella, *Desr.* 261, 264
†nervosa, *Miq.*
nigro-lineata, *Planch.* 263
ovalifolia, *Hk. f.* 269
oxyphylla, Pl. & Tr. 263
paniculata, *Roxb.* 266
papilla, Wight 262
pedunculata, *Roxb.* 264
pictoria, Roxb. 264
purpurea, Roxb. 261
purpurea, Wall. 263
Roxburghii, Wight 262
speciosa, *Wall.* 260, 267
‡*spectabilis*, 261

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* At page 194 H. cordifolia and rotundifolia should be F. etc.

† G. Andersoni, H.f. p. 270 is equal to G. nervosa, Miq., which is omitted.

‡ For G. spectabilis under G. malaccensis, p. 261, read G. speciosa.

Page
stipulata, *Anders.* 267
succifolia, *Kurz* 270
terpnophylla, *Thw.* 268
travancorica, *Bedd.* 268
umbellifera, Wall. 263
umbellifera, Roxb. 262
venulosa, Chois. 263
* *Wallichiana*, Chois. 263
Wallichii, Chois. 262
Wightii, *T. Anders.* 265
xanthochymus, *Hk. f.* 269
zeylanica, Roxb. 262
Garuga, *Roxb.* 528
? *madagascariensis*, DC. 528
pinnata, *Roxb.* 528
Gela lanceolata, Lour. 498
Gemella trifolia, Lour. 674
GERANIEÆ 426
GERANIACEÆ 426
Geranium, *Linn.* 428
aconitifolium, L'Her. 429
affine, W. & A. 431
Arnottianum, Steud. 431
Backhousianum, Regel 430
bicolor, Royle 433
choorense, Royle 433
collinum, *M.B.* 429
Donianum, Wall. 430
Donianum, Hk. f. & T. 431
eriostemon, Don 430
grandiflorum, Edgw. 430
Grevilleanum, *Wall.* 430
heterotrichon, *Sm.* 433
himalayense, Klotzsch 429
lævigatum, Royle 433
? *Lamberti*, Sw. 430
? *Lawianum*, Grah. 427
Lindleyanum, Royle 433
lucidum, *Linn.* 433
molle, *Linn.* 432
multifidum, Don 430
nepalense, *Sw.* 430
ocellatum, *Camb.* 433
pallidum, Royle 431
? palustre, *Linn.* 430
patens, Royle 431
pedunculatum, *Royle* 433
polyanthes, *Edgw. & H. f.* 431
potentilloides, Klotz. 432
pratense, *Linn.* 429
pusillum, *Linn.* 432

Page
radicans, DC. 431
rectum, *Trautv.* 429
refractum, *Edgw.* 428
Robertianum, *Linn.* 432
rotundifolium, *Linn.* 432
sibiricum, *Linn.* 431
Tuberaria, *Camb.* 431
Wallichianum, *Sw.* 430
Gilibertia nalugu, DC. 667
Glenniea, *Hk. f.* 682
zeylanica, *Hk. f.* 682
Glossospermum ? cordatum, Wall. 374
? *quinque-alatum*, Wall. 393
velutinum, Wall. 374
Glycosmis, *Correa* 499
angustifolia Lindl. 500
arborea, DC. 500
bilocularis, *Thw.* 500
chylocarpa, W. & A. 500
crenulata, Turcz. 501
macrocarpa, Wight 500
macrophylla, Lindl. 500
nitida, W. & A. 500
pentaphylla, *Correa* 499
puberula, *Lindl.* 501
Retzi, Rœm. 500
sapindoides, *Lindl.* 501
triphylla, Wight 500
Glyptopetalum, *Thw.* 612
grandiflorum, *Bedd.* 613
sclerocarpum, *Kurz* 613
zeylanicum, *Thw.* 612
Goldbachia, *DC.* 166
lævigata, *DC.* 166
torulosa, DC. 166
Gomphandra, *Wall.* 585
affinis, *Mast.* 586
axillaris, *Wall.* 586
coriacea, Wight 586
? crassipes, *Mast.* 587
penangiana, *Wall.* 587
polymorpha, *Wight* 586
polymorpha, Wight 586
tomentella, *Mast.* 587
Gomphia, *Schreb.* 525
angustifolia, *Vahl* 525
Hookeri, *Planch.* 525
malabarica, DC. 525
sumatrana, *Jack.* 525
sumatrensis, Planch. 526
umbellata, H.f. 525
zeylanica, DC. 522
Goniothalamus, *Bl.* 75
cardiopetalus, *H.f. & T.* 75

Page
fulvus, *H.f. & T.* 75
Gardneri, *H.f. & T.* 73
giganteus, *H.f. & T.* 75
Griffithii, *H.f. & T.* 73
Hookeri, *Thw.* 73
macrophyllus, *H.f. & T.* 74
malayanus, *H.f. & T.* 75
reticulatus, *Thw.* 75
salicinus, *H. f. & T.* 76
sesquipedalis, *H.f. & T.* 73
Simonsii, *H.f. & T.* 74
Thomsoni, *Thw.* 74
Thwaitesii, *H.f. & T.* 72
Walkeri, *H. f. & T.* 74
Wightii, *H. f. & T.* 76
wynaadensis, *Bedd.* 74
Gordonia, *Ellis* 290
acuminata, Wall., 282, 290
anomala, Spr. 292
Chilaunia, Ham. 289
decandra, Roxb. 417
elliptica, *Gardn.* 291
excelsa, *Bl.* 291
floribunda, Wall. 289
integrifolia, Roxb. 289
Maingayi, *Dyer* 291
mollis, Wall. 288
oblata, Roxb. 289
obtusa, *Wall.* 291
obtusifolia, Wight 291
parvifolia, Wight 291
? *peduncularis*, Wall. 416
reticulata, Wall. 282
singaporiana, Wall. 291
speciosa, *Thw.* 292
superba, H. f. & T. 289
Wallichii, DC. 289
zeylanica, *Wight* 291
GORDONIEÆ 279
Gossampinus rubra, Ham. 349
Gossypium, *Linn.* 346
acuminatum, Roxb. 347
album, W. & A. 346
arboreum, Linn. 347
barbadense, Linn. 347
herbaceum, Linn. 346
hirsutum, Linn. 347
indicum, Lamk. 346
micranthum, DC. 346
nigrum, Ham. 347
nigrum, W. & A. 347
obtusifolium, Roxb. 347

---

* For Wallichiana p. 263, under G. Cowa read Wallichii.

Page
peruvianum, Cav. . 347
religiosum, Roxb. . 347
religiosum, Parl. . 347
rubicundum, Roxb. 347
Stocksii, *Mast.* . . 346
vitifolium, Lamk. . 347
vitifolium, Roxb. . 347
Gouania, *Linn.* 643
integrifolia, Kurz . 643
lanceolata, Wall. . 644
leptostachya, *DC.* . 643
microcarpa, *DC.* . . 643
napalensis, *Wall.* . 644
tiliæfolia, Heyne . 643
GOUANIEÆ 630
Gouffeia crassiuscula, Camb. 241
Granatum littoreum, Rumph. . . . 567
Grewia, *Linn.* . . . 383
abutilifolia, *Juss.* . 390
acuminata, Juss. . 389
affinis, Lindl. . . . 393
affinis, Hassk. . . 393
angustifolia, Wall. . 391
araria, Wall. . . . 386
arborea, Roth . . 386
asiatica, *Linn.* . . 386
asiatica, Wall. 387, 390
aspera, Roxb. . . 390
begonifolia, Wall. . 393
betulæfolia, Juss. . 385
bicolor, Roth . . 385
bicolor, Juss. . . . 386
biloba, Wall. . . . 391
bipartita, Wall. . . 388
Blumei, Hassk. . . 393
bracteata, *Roth* . . 389
bracteata, Miq. . . 383
calophylla, *Kurz* . . 392
carpinifolia, *Juss.* . 387
carpinifolia, Wall. . 383
carpinifolia, Roth . 384
carpinifolia, Roxb. . 388
Carrea, Ham. . . 387
? *caudata*, Wall. . . 379
columnaris, *Sm.* . . 383
commutata, DC. . . 388
coriacea, Garcke . 388
corylifolia, Guill. & Perr. 388
didyma, Roxb. . . 389
diplocarpa, *Thw.* . 390
disperma, Rottl. . 389
elastica, Royle . . 387
emarginata, *W. & A.* 384
excelsa, *Vahl* . . 385
ferruginea, Hochst. 389

Page
fibrocarpa, *Mast.* . 391
flavescens, Juss. . 388
glabra, Jack . . . 393
globulifera, *Mast.* . 391
helicterifolia, Wall. 391
heteroclita, Roxb. . 379
heterotricha, *Mast.* 385
hirsuta, *Vahl* . . 391
hirsuta, Wall. . . 391
humilis, *Wall.* . . 390
involucrata, Wall. . 384
involucrata, Wight . 388
lævigata, *Vahl* . . 389
Lalpeta, Ham. . . 389
? *lanceæfolia*, Roxb. 391
lanceolata, Hb. Hey. 391
lancifolia, Grah. . 391
latifolia, *Mast.* . . 392
laurifolia, *Hook* . . 392
longifolia, Ham. . 391
macrophylla, G. Don 390
Microcos, *Linn.* . . 392
microstemma, *Wall.* 390
mollococca, Ham. . 389
multiflora, *Juss.* . . 388
nana, Wall. . . . 387
obliqua, Roxb. . . 387
obtecta, Wall. . . 387
obtusa, Wall. 383, 384, 389
odorata, Bl. . . . 389
oppositifolia, *Roxb.* . 384
orbicularis, G. Don . 386
orbiculata, *Rottl.* . 386
orbiculata, Wall. . 386
orbiculata, G. Don . 88
orientalis, *Linn.* . 384
orientalis, Vahl . . 383
orientalis, Wall. . . 384
orientalis, Gærtn. . 388
ovalifolia, Wight . 384
ovalifolia, Juss. . . 389
paniculata, *Roxb.* . 393
pedicellata, Roxb. . 385
pilosa, *Lamk.* . . 388
pilosa, Wall. 383, 384, 387, 389
pilosa, Roxb. . 390, 391
polygama, *Roxb.* . 391
populifolia, *Vahl* . 385
pumila, Ham. . . 387
retusifolia, Kurz . 390
rhamnifolia, Roth . 384
rigida, Ham. . . 385
Ritchiei, *Mast.* . . 389
Rothii, DC. . . . 385
rotundifolia, Juss. . 386
Roxburghii, G. Don . 391
rugosa, Wall. . . 393

Page
salvifolia, *Heyne* . . 386
salvifolia, Roxb. . 385
salvifolia, Wall. . . 391
sapida, *Roxb.* . . 387
saxatilis, Ham. . . 391
scabrida, *Wall.* . . 389
scabrida, Wall. . . 388
scabrophylla, *Roxb.* . 387
sclerophylla, Wall. . 387
sepiaria, Roxb. . . 388
serrulata, DC. . . 388
sinuata, *Wall.* . . 392
subinæqualis, DC. . 386
subinæqualis, Wall. . 386
suffruticosa, Ham. . 387
sulcata, Wall. . . 387
Sulcoria, Ham. . . 391
tiliæfolia, *Vahl* . . 386
ulmifolia, Roxb. . 392
umbellata, *Roxb.* . 385
umbellifera, Bedd. . 393
variabilis, Wall. . . 386
vestita, Wall. . . . 387
villosa, *Willd.* . . 388
viminea, Wall. . . 391
GREWIEÆ 380
Guarea acuminata, Wall. 574
Alliaria, Ham. . . 548
? *Amaris*, Ham. . 546
binectarifera, Roxb. 546
disyphonia, Griff. . 547
Gobara, Ham. . . 547
Gotadhora, Buch. . 546
grandis, Wall. . . 547
mollis, Wall. . . . 548
oblonga, Wall. . . 547
oblongifolia, Griff. . 567
paniculata, Wall. . 548
paniculata, Roxb. . 552
procera, Wall. . . 547
Guatteria acutifolia, Wall. 89
acutiflora, Wall. . 64
bifaria, A. DC. . . 62
biglandulosa, Bl. . 65
brevipetala, Miq. . 66
caudata, Wall. . . 85
cerasoides, Dun. . 64
cinnamomea, Wall. . 65
coffeoides, Thw. . . 62
cordata, Dun. . . 49
costata, H. f. & T. . 67
fasciculata, Wall. . 63
fragrans, Dalz. . . 63
globosa, A. DC. . . 87
Jenkinsii, H. f. & T. 64
Korinti, Dun. . . 64

Page
laurifolia, Grah. . 93
longifolia, Wall. . 62
macrophylla, Bl. . 66
Malabarica, Dun. . 51
membranacea, A.DC. 68
micrantha, A. DC. . 51
montana, DC. . . 51
multinervis, Wall. . 65
nitida, A. DC. . . 64
pallida, H. f. & T. . 67
persicæfolia, H. f. & T. 66
ramosissima, Wall. 68
sesquipedalis, Wall. 73
simiarum, Ham. . 63
suberosa, DC. . . 65
unonæfolia, A.DC. 71
velutina, A.DC. . 87
Guazuma, *Plum.* . 375
tomentosa, *Kunth.* 375
ulmifolia, Wall. . 375
Gumsia chloroxylon, Ham. 371
hirta, Ham. . . . 370
tiliacea, Wall. . . 371
Gustonia nalugu, Spr. 667
Guttifera, . . 266, 267
GUTTIFERÆ 258
Gymnosporia, *W. & A.* 618
acuminata, *H. f.* . 619
emarginata, *Roth.* . 621
Falconeri, *Laws.* . 620
fruticosa, *Thw.* . . 619
Heyneana, *W. & A.* . 620
montana, *Roxb.* . . 621
neglecta, *Wall.* . . 619
oblanceolata, *Laws.* 619
ovata, *Wall.* . . . 619
puberula, *Laws.* . . 619
Rothiana, *W. & A.* . 620
Royleana, *Wall.* . . 620
rufa, *Wall.* . . . 620
rugulosa, *Laws.* . . 621
salicifolia, *Laws.* . 619
Wallichiana, *Spr.* . 621
Gynandropsis, *DC.* . 170
pentaphylla, *DC.* . 171
Gynocardia, *Br.* . . 195
odorata, *Br.* . . . 195
Gynocephalum bracteatum, Tréc. . . 592
giganteum, Tréc. . 591
oblongum, Tréc. . 592
palmatum, Tréc. . 592
Gypsophila, *Linn.* . 216
cerastioides, *Don* . 217
sedifolia, *Kurz.* . . 217
Stewartii, *Thoms.* . 216
Tibetica, H. f. & T. . 217

Page
Habzelia ferruginea, H. f. & T. . . . 83
oxyantha, H. f. & T. 83
Hæmatocarpus, *Miers* . 106
Thomsoni, *Miers* . 106
Hapalosa Laflingiæ, Wall. 245
Harpullia, *Roxb.* . . 691
cupanoides, *Roxb.* . 692
imbricata, Thw. . 692
Harrisonia, *Br.* . . 519
Bennetii, *H. f.* . . 519
Brownii ?, Kurz . 519
Hartigsea Alliaria, Arn. 548
Gobara, W. & A. . 547
ramiflora, Griff. . . 549
Hebradendron cambogioides, Grah. . 265
Choisyanum, Chois. 265
Wallichii, Chois. . 265
Hedera hypoglauca, Hance 663
Helicteres, *Linn.* . . 365
angustifolia, *Linn.* . 365
carthagenensis, Wall. 366
chrysocalyx, Miq. . 365
elongata, *Wall.* . . 365
glabriuscula, *Wall.* . 366
grewiæfolia, Wall. . 366
hirsuta ?, Hb. Ham. 366
Isora, *Linn.* . . . 365
lanceolata, DC. . . 365
lanigera, Wall. . . 366
longifolia, Wall. . 366
oblonga, Wall. . . 366
obtusa, *Wall.* . . 366
plebeja, *Kurz* . . 366
Roxburghii, G. Don 365
spicata, *Colebr.* . . 366
? *spinulosa*, Wall. . . 366
vestita, Wall. . . 366
virgata, Wall. . . 365
HELICTEREÆ . . . 353
Helie atalantioides, Rœm. 508
Helinus, *E. Mey.* . . 644
lanceolatus, *Brandis* 644
HELLEBOREÆ . . . 1
Hemigyrosa, *Bl.* . . 670
canescens, *Thw.* . . 671
deficiens, *Bedd.* . . 671
longifolia, *Hiern.* . 671
trichocarpa, Thw. . 671
Hemiphractum oxyandrum, Turcz. . . 313
Hepatica, sp. . . . 8

Page
Heritiera, *Ait.* . . . 362
attenuata, Wall., 363, 517
Fomes, *Buch.* . . 363
Fomes, Wall. . . . 363
littoralis, *Dryand.* . 363
macrophylla, Hort. . 363
minor, Roxb. . . 363
Papilio, *Bedd.* . . 363
Hermannia alnifolia, Wall. 322
HERMANNIEÆ . . . 354
Hesperethusa acidissima, Rœm. . . 507
ambigua, Rœm . . 507
crenulata, Rœm. . 507
HETEROPETALÆ . . . 380
Heteropyxis, Griff. . 352
Heynea, *Roxb.* . . . 565
affinis, Juss. . . . 565
connaroides, Wight . 565
pubescens, Kurz . . 565
quinquejuga, Roxb. . 565
trifoliata, Juss. . . 564
trijuga, *Roxb.* . . 565
HIBISCEÆ 318
Hibiscus, *Medik.* . . 334
Abelmoschus, *Linn.* 342
acerifolius, Wall. . 338
aculeatus, Roxb. . 335
æstuans, Wall. . . 338
æstuans, *Rottl.* . . 344
albus, Wall. . . . 336
angulosus, *Mast.* . 341
Arnotti, Griff. . . 344
asperatus, Wall. . 338
bifurcatus, Roxb. . 335
borbonicus, Wight . 337
canaranus, Miq. . 341
cancellatus, *Roxb.* . 342
canescens, *Heyne* . 337
cannabinus, *Linn.* . 339
chinensis, Wall. . . 342
clandestinus, Cav. . 335
collinus, *Roxb.* . . 338
coriaceus, Heyne . 332
crotonifolius, Wall. 332
cuspidatus, Edgw. . 338
dissectus, Wall. . . 334
diversifolius, *Jacq.* . 339
eriocarpus, DC. . 338
esculentus, Linn. . 343
ficulneus, *Linn.* . . 339
flavescens, Cav. . . 342
floccosus, *Mast.* . . 343
fragrans, *Roxb.* . . 337
furcatus, *Roxb.* . . 335
furcatus, Wall. . . 334
gangeticus, Roxb. . 345

Page
Gibsoni, *Stocks* . . 339
heptaphyllus, Dalz. & Gibs. . . . 335
hirtus, *Linn.* . . 335
hirtus, Buch. . . 342
hispidissimus, Griff. 335
hostilis, *Wall.* . . 342
intermedius, *A.Rich* 336
laguneoides, Edgw. . 340
Lampas, Cav. . . 345
liliiflorus, Griff. . 344
Lindleii, Wall. . . 335
longifolius, Roxb. . 343
lunariifolius, *Willd.* 338
macrophyllus, *Roxb.* 337
Manihot, Linn. . . 341
micranthus, *Linn.* . 335
mutabilis, Linn . . 344
obtusifolius, Willd. . 338
odoratus, Roxb. . . 331
ovalifolius, Vahl . 336
panduræformis, *Burm.* 338
pentaphyllus, F Mu. 340
pentaphyllus, *Roxb.* 341
phœniceus, Willd. . 335
populneoides, Roxb. 345
populneus, Linn. . 345
procerus, *Wall.* . . 339
prostratus, Roxb. . 340
pruriens, Roxb. . . 338
pterospermoides, Wight 332
pumilus, Roxb. . . 336
punctatus, *Dalz.* . 340
pungens, *Roxb.* . . 341
racemosus, Lindl. . 338
radiatus, *Willd.* . . 335
rhombifolius, Cav. . 344
ricinifolius, Wall. . 342
rigidus, Linn. f. . . 335
rosa-malabarica, Ker 335
rosa-sinensis, Linn. 344
rugosus, *Mast.* . . 342
Sabdariffa, *Linn.* . 340
sagittifolius, Kurz. . 342
? *sanguineus*, Griff. . 342
scaber, Wall. . . . 339
scandens, *Roxb.* . . 337
scandens, Dalz. & Gibs. 336
scindicus, *Stocks* . 336
septemnervosus, Wight. 337
serratus, Wall. . . 338
setosus, Roxb. . . 337
setosus, *Wall.* . . 338

Page
sidoides, W. & A. . 338
simplex, Roxb. . . 338
sinuatus, Cav. . . 340
solandra, *L'Her.* . 386
spathaceus, Wall. . 342
strictus, Roxb. . . 340
suborbiculatus, Wall. 336
surattensis, *Linn.* . 334
syriacus, Linn. . . 344
tetralocularis, Roxb. 345
tetraphyllus, *Roxb.* . 341
tiliaceus, *Linn.* . . 343
tortuosus, Roxb. . 343
tricuspis, Banks . . 344
Trionum, *Linn.* . . 334
truncatus, Roxb. . 338
tubulosus, Cav. . . 338
velutinus, DC. . . 338
venustus, Bl. . . . 344
vesicarius, Cav. . . 334
vestitus, Griff. . . 337
vestitus, Wall. . . 341
vitifolius, *Linn.* . . 338
Wightianus, Wall. . 339
zeylanicus, Linn. . 331
Hildegardia populifolia, Br. . . . 361
Hippocratea, *L.* . . 623
angulata, Griff. . . 611
arborea, *Roxb* . . 625
Arnottiana, *Wight* . 624
barbata, F. Muell. . 623
Cumingii, *Laws.* . 624
disperma, Vahl. . 625
? disperma, *Wall.* . 625
euonymoides, Vahl. . 625
Grahami, *Wight* . . 624
? *grandiflora*, Wall. 624
indica, Willd. . . 624
lanceolata, Wall. . 624
Lobbii, *Laws.* . . 624
Maingayi, *Laws.* . 625
obtusifolia, *Roxb.* . 623
obtusifolia, Roxb. . 625
rigida, Hamp. . . 624
tortuosa, Wall. . . 624
volubilis, Heyn. . . 624
HIPPOCRATEÆ . . . 607
Hiptage, *Gærtn.* . . 418
acuminata, *Wall.* . 419
candicans, *Hk.* . . 419
Madablota, *Gærtn.* . 418
parviflora, Wight . 419
parvifolia, *W. & A.* 419
sericea, *Hk. f.* . . 419
Hiræa concava, Wall. 420
cordata, Heyne . . 421
glabriuscula, Wall. . 420

Page
Finlaysoniana, Wall. 422
hirsuta, Wall. . . 421
indica, Roxb. . . 420
indica, Wall. . . 421
lanuginosa, Wall. . 421
Merguensis, Wight . 420
nutans, Wall. . . 421
nutans, Roxb. . . 421
orbiculata, Roxb. . 421
oxyphylla, Wall. . 420
Holbœllia, *Wall.* . . 108
acuminata, Lindl. . 108
angustifolia, Wall. . 108
latifolia, *Wall.* . . 108
Holopeira auriculata, Miers 101
australis, Miers . . 101
fusiformis, Miers . 101
læviuscula, Miers . 101
laurifolia, Miers . 101
villosa, Miers . . . 101
HOLOPETALÆ . . . 380
Holosteum, *Linn.* . . 226
umbellatum, *Linn.* . 227
Hopea, *Roxb.* . . . 308
decandra, Buch. . 308
discolor, *Thw.* . . 310
eglandulosa, Roxb. . 308
faginea, Hort. Calc. 308
faginea, Wall. . . 301
floribunda, Wall. . 304
glabra, *W. & A.* . 309
grandiflora, Wall. . 301
gratissima, Wall. . 307
Griffithii, *Kurz* . . 310
jucunda, *Thw.* . . 310
longifolia, *Dyer* . . 309
micrantha, *Hk. f.* . 310
oblongifolia, *Dyer* . 309
odorata, *Roxb.* . . 308
odorata, Wall. . . 308
parviflora, *Bedd.* . 308
parviflora, Bedd. . 309
racophlœa, *Dyer* . 310
scaphula, Roxb. . . 301
suava, Wall. . . . 304
vasta, Wall. . . . 308
Wightiana, *Wall.* . 309
Wightiana, Miq. . 308
Hovenia, *Thunb.* . . 640
acerba, Lindl. . . 640
dulcis, *Thunb.* . . 640
inæqualis, DC. . . 640
Hugonia, *Linn.* . . 413
ferruginea, *W. & A.* 413
Mystax, *Linn.* . . 413
obovata, Ham. . . 413
HUGONIEÆ 410

Page
Humea elata, Roxb. . 318
Hutchinsia, Griff. . . 139
  procumbens, Desv. . 159
  tibetica, Thoms. . . 159
Hyalostemma Roxburghiana, Wall. . 87
Hydnocarpus, *Gærtn.* . 196
  alpina, *Wight.* . . 197
  castanea, *H. f. & T.* 197
  inebrians, Vahl. . . 196
  inebrians, Wall. . . 196
  octandra, *Thw.* . . 197
  venenata, *Gærtn.* . 196
  Wightiana, *Bl.* . . 196
Hydrocera, Bl. . . . 483
  angustifolia, Bl. . . 483
  triflora, *W. & A.* . 483
Hydropeltis purpurea, Rich. 113
Hymenocalyx variabilis, Zenk. . . 341
Hypecoum, *Tourn.* . 120
  leptocarpum, *H. f. & T.* 120
  procumbens, *Linn.* . 120
HYPERICEÆ 252
HYPERICINEÆ . . . 252
Hypericinea dentata, Wall. 416
  macrocarpa, Wall. . 417
  pedunculosa, Wall. 416
Hypericum, *Linn.* . . 253
  acutum, Wall. . . 253
  adenophorum, Wall. 256
  alternifolium, Vahl. 294
  arborescens, Vahl. . 258
  bracteatum, Wall. . 253
  breviflorum, Wall. . 257
  calycatum, Jacq. . 256
  carneum, Wall. = cratoxylon polyanthum, *Korth.* . . 257
  cernuum, *Roxb.* . . 253
  Choisianum, Wall. . 254
  coccineum, Wall. . 258
  cordifolium, *Chois.* . 253
  coriaceum, Royle . 254
  elodeoides, *Chois.* . 255
  erectum, Thbg. . . 255
  filicaule, H. f. & T. 252
  fœtidum, H. f. & T. 257
  Govanianum, Wall. 253
  Griffithii, *H. f. & T.* 253
  Hookerianum, *W. & A.* 254
  horridum, Wall. . 257
  humifusum, *Linn.* 255, 256
  intermedium, Stend. 256
  japonicum, *Thunb.* . 256

Page
  Lalandii, *Chois.* . . 256
  Leschenaultii, Chois. 254
  lysimachioides, *Wall.* 254
  monanthemum, *H. f. & T.* 256
  montanum, Linn. . 256
  myrtifolia, Spach . 253
  mysorense, *Heyne* . 253
  napaulense, *Chois.* 256
  neriifolium, Wall. . 257
  nervosum, Don . . 256
  oblongifolium, Chois. 253
  oblongifolium, Hook. 254
  oblongifolium, Wall. 254
  pallens, Don . . 256
  patulum, *Thunb.* . 254
  perforatum, *Linn.* . 255
  petiolatum, Wall. . 257
  petiolulatum, *H. f. & T.* 255
  prunifolium, *Dyer* . 258
  pulchellum, Wall. . 257
  pusillum, Chois. . 256
  reptans, *H. f. & T.* 255
  rubrum, Wight . . 255
  Sampsoni, *Hance* . 255
  setosum, Wall. . . 256
  speciosum, Wall. . 253
  tenuicaule, *H. f. & T.* 254
  triflorum, Bl. . . 254
  uralum, Ham. . . 254
  Wightianum, Wall. 256
Hypserpa cuspidata, Miers 100
  pauciflora, Miers . 100
  prævaricata, Miers 100
  uniflora, Miers . . 100

Iberidella, *Boiss.* . . 162
  Andersoni, *H. f. & T.* 163
ICACINEÆ 573
Icica dentata, DC. . 506
  indica, W. & A. . 531
Ilex, *Linn.* 598
  asiatica, Linn. . . 606
  cymosa, *Bl.* . . . 605
  daphnephylloides, Kurz 606
  denticulata, *Wall.* . 600
  dipyrena, *Wall* . . 599
  ? *elliptica,* Don . . 603
  emarginella, Turcz. . 600
  embelioides, *H. f.* . 601
  excelsa, *Wall.* . . 603
  exsulca, Wall. . . 603
  fragilis, *H. f.* . . . 602
  Gardneriana, *Wight* 603

Page
  Gaultheriæfolia, Kur. 601
  Godajam, *Colebr.* . 604
  Griffithii, *H. f.* . . 601
  Horsfieldii, Miq. . 602
  insignis, *H. f.* . . 599
  intricata, *H. f.* . . 602
  macrophylla, *Wall.* . 604
  Maingayi, *H. f.* . . 605
  malabarica, *Bedd.* . 600
  niligirica, Miq. . . 600
  odorata, *Ham.* . . 599
  rotunda, Thunb. . 604
  sclerophylla, *H. f.* . 606
  singapuriana, Wall. 605
  spicata, *Bl.* . . . 598
  sulcata, *Wall.* . . 604
  theæfolia, *Wall.* . . 601
  Thomsoni, *H. f.* . . 602
  venulosa, H. f. . . 602
  Walkeri, *Wt. & Gard.* 600
  Walkerii, Turcz. . 600
  Wallichii, *H. f.* . . 605
  Wightiana, *Wall.* . 603
  Wightiana, Dalz. & Gibs. 600
ILICINEÆ 598
Ilicinea ? 605
Illecebrum verticillatum, Burm. . . 247
Illicium, *Linn.* . . . 39
  Griffithii, *H. f. & T.* 40
  majus, *H. f. & T.* . 40
Impatiens, *Linn.* . . 440
  acaulis, *Arn.* . . 443
  acuminata, *Benth.* . 462
  Akka, Bedd. . . . 443
  albida, Wight . . 458
  amphorata, *Edgw.* 475, 476
  amplexicaulis, *Edgw.* 469
  anamalayensis, Bedd. 452
  angustiflora, *H. f.* . 480
  appendiculata, *Arn.* 464
  arcuata, Wall. . . 454
  arguta, *H. f. & T.* . 470
  Arnottiana, Miq. . 446
  Arnottii, *Thw.* . . 466
  assamensis, Griff. . 483
  auriculata, *Wight* . 460
  Ballardi, *Bedd.* . . 482
  Balsamina, *Linn.* . 453
  Balsamina, Dalz. . 454
  Beddomei, *H. f.* . 442
  bella, *H. f. & T.* . 458
  bicolor, Royle . . 476
  bicornuta, *Wall.* . 475
  bifida, Thunb. . . 457
  biglandulosa, Moon . 463
  bipartita, Arn. . . 457

Page
brachycentra, *Kar. & Kir* 481
bracteata, Coleb. 461
brevicornu, Arn. 455
bulbosa, Moon. 443
calycina, Wall. 472
campanulata, *Wight* 463
candida, Lindl. 469
capillipes, *H. f. & T.* 456
Cathcartii, *H. f.* 473
chinensis, *Linn.* 444
circæoides, *Wall.* 453
circæoides, Turcz. 452
clavicornu, Turcz. 483
coccinea, Wall. 454
concinna, *Hk. f.* 449
cordata, *Wight* 462
cornigera, *Arn.* 466
cornigera, Hook. 454
cornuta, Linn. 454
crenata, *Bedd.* 442
cristata, Wall. 472
cuspidata, W. & A. 450
cymbifera, *H. f.* 474
Dalzellii, *H. f. & T.* 449
dasysperma, *Wight* 457
debilis, Turcz. 483
Denisonii, *Bedd.* 444
depauperata, *H. f.* 481
discolor, *Wall.* 471
diversifolia, *Wall.* 446
Edgeworthii, *H. f.* 476
elata, Edgw. 481
elegans, *Bedd.* 465
elongata, *Arn.* 466
eriantha, Turcz. 457
fasciculata, Lamk. 444
filiformis, W. & A. 447, 448
fimbriata, *Hook.* 461
flaccida, *Arn.* 457
flaccida, var. β, H. f. & T. 458
flavida, *H. f. & T.* 452
floribunda, Wight 457
fruticosa, *DC.* 459
Gardneriana, *Wight* 445
Gardneriana, Wight 450
gibbosa, Arn. 455
gigantea, Edgw. 469
glandulifera, *Arn.* 454
glandulifera, var. ? Arn. 455
glandulifera, Royle 468
glauca, *H. f. & T.* 482
Goughii, *Wight* 452
gracilis, Bedd. 443
grandis, *Heyne* 463

Page
Griffithii, *H. f. & T.* 445
Hamiltoniana, Don 472
Henslowiana, *Arn.* 458
heterophylla, Wall. 444
hispidula, Benth. 470
Hoffmeisteri, Klotz. 471
Hookeriana, *Arn.* 463
inconspicua, Benth. 447
inconspicua, Wight 448
insignis, *DC.* 477
janthina, *Thw.* 461
Jerdoniæ, *Wight* 460
Jurpia, *Ham.* 471
Kleinii, *W. & A.* 445
lævigata, *Wall.* 473
latiflora, *H. f. & T.* 459
latifolia, *Linn.* 450
latifolia, Hook. 457
latifolia, Moon 457
latifolia, W. & A. 451
Lawii, *H. f. & T.* 448
laxiflora, *Edgw.* 479, 480
laxiflora ? Wall. 478
laxiflora, H. f. & T. 481
leptoceras, DC. 477
leptoceras, var. α, H. f. & T. 477, 480
leptoceras, var. β, H. f. & T. 479
leptoceras, vars., H. f. & T. 480
leptopoda, *Arn.* 455
leptura, *H. f.* 467
Leschenaultii, *Wall.* 450
leucantha, *Thw.* 464
ligulata, *Bedd.* 446
linearis, *Arn.* 464
lineata, Turcz. 468
Lobbiana, Turcz. 454
longicornu, Wall. 475, 476, 477
longiflora, Heyne 447
longifolia, Wight 454
longipes, *H. f. & T.* 473
lucida, *Heyne* 451
macrochila, Lindl. 469
macrophylla, *Gardn.* 454
maculata, *Wight* 465
malayensis, Griff. 483
micrantha, Don 479
micranthemum, *Edg.* 481
mishmiensis, *H. f.* 476
modesta, *W. & A.* 442
mollis, Wall. 470
moschata, Edgw. 469
multiflora, Wall. 470
Munronii, *Wight* 456
mysorensis, *Roth.* 456

Page
mysorensis, Roth. 447
mysorensis, Wall. 447
? *natans*, Willd. 483
odorata, Don. 477
oppositifolia, *Linn.* 448
orchioides, *Bedd.* 443
pallens, Edgw. 476
paludosa, *H. f.* 480
parasitica, Bedd. 460
Parishii, *H. f.* 456
parvifolia, *Bedd.* 453
pendula, *Heyne* 455
Perotettii, Turcz. 447
phœnicea, *Bedd.* 466
picta, Kn. & West. 476
porrecta, *Wall.* 472
puberula, *DC.* 470
pulcherrima, *Dalz.* 458
pulchra, *H. f. & T.* 459
pulniensis, *Bedd.* 452
pusilla, Heyne, 447, 448
racemosa, *DC.* 479
racemosa, H. f. 476
racemosa, Wall. 478, 479
racemulosa, *Wall.* 468
radiata, *H. f.* 476
radicans, *Benth.* 451
ramosissima, Dalz. 447, 448
repens, *Moon* 455
reticulata, *Wall.* 448
rivalis, *Wight* 444
rosea, Lindl. 454
rosmarinifolia, Retz 447, 448
rosmarinifolia, Wight 447
Roylei, *Walp.* 468
Roylei, Klotzsch 476
rufescens, Benth. 449
salicifolia, *H. f. & T.* 450
salicifolia, Turcz. 450, 454
scabrida, *DC.* 472
scabriuscula, *Heyne* 454
scapiflora, *Heyne* 443
scapiflora, Hook. 443
scapiflora, W. & A. 442
semiverticillata, Tcz. 482
serrata, *Benth.* 473
setacea, Colebr. 444
setosa, *H. f. & T.* 445
spirifer, *H. f. & T.* 471
stenantha, *H. f.* 478
Stocksii, *H. f. & T.* 442
subcordata, *Arn.* 461
sulcata, *Wall.* 469, 475
Tangachee, *Bedd.* 467

Page
tavoyana, *Benth.* 468
tenella, *Heyne* 447
tenella, Rottl. 447
tenella, Wall. 446
tenuicula, Steud. 447
tenuis, Bedd. 442
Thomsoni, *H. f.* 469
tingens, Edgw. 479
tomentosa, Dalz. 447
tomentosa, *Heyne* 449
travancorica, *Bedd.* 464
tricornis, Lindl. 472
triflora, Linn. 483
trilobata, *Colebr.* 451
tripetala, *Roxb.* 470
tropæolifolia, *Griff.* 472
truncata, *Thw.* 455
tuberculata, *H. f. & T.* 478
umbellata, *Heyne* 461
umbrosa, H. f. 476
umbrosa, Edgw. 476
uncinata, *Wight* 465
urticifolia, *Wall.* 474
urticifolia β, H. f. & T. 474
verrucosa, Bedd. 444
verticillata, *Wight* 452
violæflora, *H. f.* 457
viridiflora, *Wight* 460
viscida, *Wight* 462
viscosa, *Bedd.* 452, 453
Walkeri, *Hook.* 467
Wightiana, *Bedd.* 467
Iodes, *Bl.* 595
? Brandisii, *Kurz* 596
Hookeriana, *Baill.* 596
oblonga, *Planch.* 597
ovalis, *Bl.* 596
ovalis, var. *Miquelii*, Baill. 596
Thomsoniana, *Baill.* 596
tomentella, Miq. 596
Ionidium, *Vent.* 185
cuneaspermum, DC. 185
erectum, DC. 185
heterophyllum, DC. 185
hexaspermum, Dalz. 185
leptorhizum, DC. 185
ramosissimum, *Thw.* 186
suffruticosum, *Ging.* 185
Wightianum, Wall. 185
Iriva glabra, Bl. 691
Irvingia, *H. f.* 522
malayana, *Oliv.* 522
ISATIDEÆ 130
Isatis, *Linn.* 163
costata, *C. A. Mey.* 163
tinctoria, *Linn.* 163
spartioides, Edgw. 164

Page
Isauxis Roxburghiana, Thw. 303
cordifolia, Thw. 303
Isopteris penangiana, Wall. 208
Isopyrum, *Linn.* 23
adiantifolium, *H. f. & T.* 23
anemonoides, Kar. & Kir. 23
grandiflorum, *Fisch.* 23
microphyllum, Royle 23
thalictroides, *Linn.* 23
IXONANTHEÆ 410
Ixonanthes, Jack. 416
cuneata, *Miq.* 416
dodecandra, Griff. 416
icosandra, *Jack.* 416
khasiana, *H. f.* 416
obovata, *H. f.* 417
reticulata, *Jack.* 417

Jambolifera pedunculata, Vahl. 498
Jenkinsia assamica, Griff. 593
Johnia coromandeliana, Roxb. 626
salacioides, Roxb. 627
Julostyles *Thw.* 333
angustifolia, *Thw.* 333

Kadsura, *Kæmpfer* 45
grandiflora, Wall. 44
japonica, Wall. 45
propinqua, Wall. 45
Roxburghiana, *Arn.* 45
scandens, Bl 45
Wightiana, *Arn.* 45
Kayea, *Wall.* 276
cuspidata, Planch. & Tr. 277
floribunda, *Wall.* 276
nervosa, *T. Anders.* 277
racemosa, *Planch. & Tr.* 276
stylosa, *Thw.* 276
Kingstonia, *H. f. & T.* 93
nervosa, *H. f. & T.* 93
Kittelocharis trigyna, Alef. 412
Kleinhovia, *Linn.* 364
Hospita, *Linn.* 364
Kokoona, *Thw.* 616
littoralis, *Laws* 617
zeylanica, *Thw.* 616
Koon zeylanicus, Gærtn. 105
Krascheninnikowia rupestris, Turcz. 231

Page
Kurrimia, *Wall.* 621
bipartita, *Laws* 622
calophylla, Wall. 622
ceylanica, *Arn.* 622
Maingayi, *Laws.* 622
paniculata, *Wall.* 622
pulcherrima, *Wall.* 622
robusta, Kurz 622
Kydia, *Roxb.* 348
angustifolia, Arn. 333
axillaris, Thw. 333
calycina, *Roxb.* 348
fraterna, Roxb. 348
glabrescens, *Mast.* 348
jujubifolia, Griff. 333
pulverulenta, Ham. 348
Roxburghiana, Wight 348

Lagunea aculeata, Cav. 340
lobata, Willd. 336
sileniflora, Wall. 336
Lahaya corymbosa, Schult. 245
spadicea, Schult. 245
Lampetia racemosa, Rœm. 512
Lancretia suffruticosa, Del. 251
Lansium, *Rumph.* 557
anamalayanum, *Bedd.* 558
aqueum, Miq. 558
cinereum, *Hiern.* 558
domesticum, *Jack.* 558
humile, Hassk. 558
javanicum, Rœm. 558
pedicellatum, *Hiern* 558
silvestre, Rœm. 559
LARDIZABALEÆ 107
Lasianthera, *P. de Beauv.* 584
apicalis, *Thw.* 584
? lanceolata, *Mast.* 585
Maingayi, *Mast.* 585
malaccensis, *Mast.* 584
secundiflora, Miq. 584
? *tetrandra*, Wall. 586
prasina, Miq. 587
Lasiolepis Bennettii, Planch. 519
multijuga, Benn. 519
paucijuga, Benn. 519
Laureola fragrans, Rœm. 499
Lavallea ceylanica, Baill. 579
Lavatera, *Linn.* 319
Kashmiriana, *Camb.* 319
Lebretonia flava, Wall. 331

Page
procumbens, Wall. 331
Leea, *Linn.* 664
acuminata, Wall. 666
æquata, Wall. 666
æquata, DC. 667
alata, *Edgw.* 665
angustifolia, *Laws.* 665
aspera, *Wall.* 665, 667
cinerea, *Laws.* 665
compactiflora, Kurz 667
cordata, Wall. 668
coriacea, *Laws.* 665
crispa, *Willd.* 665
diffusa, *Laws.* 667
gigantea, Griff. 666
? *herbacea*, Wall. 666
hirta, *Roxb.* 668
integrifolia, *Roxb.* 667
læta, Wall. 666
lævis, Hb. Heyne 565
latifolia, Wall. 664
macrophylla, *Roxb.* 664
? *macrophylla*, DC. 665
odontophylla, Wall. 668
ottilis, DC. 666
parallela, *Laws.* 666
pinnata, Andrews 665
pumila, *Kurz* 666
robusta, *Roxb.* 667
rubra, Royle 665
sambucina, *Willd.* 666
? var. *sanguinea*, Wall. 666
scabra, Steud. 668
simplicifolia, Griff. 664
staphylea, Wall. 666
staphylea, Roxb. 667
trifoliata, *Laws.* 666
Leontoglossum scabrum, Hance 31
LEPIDINEÆ 130
Lepidium, *Linn.* 159
capitatum, *H.f. & T.* 160
chalepense, Schrenk. 160
Draba, *Linn.* 160
incisum, Edgw. 160
latifolium, *Linn.* 160
repens, Boiss. 160
ruderale, *Linn.* 160
sativum, *Linn.* 159
Lepidostemon, *H. f. & T.* 147
pedunculosus, *H. f. & T.* 147
Lepionurus, *Bl.* 583
oblongifolius, *Mast.* 583
Lepisanthes, *Bl.* 679
Browniana, *Hiern* 680

Page
cuneata, *Hiern* 680
montana, *Bl.* 679
Lepta triphylla, *Lour.* 488
Leptocarpæa Lœselii, DC. 151
Leptonium oblongifolium, Griff. 583
Leptonychia, *Turcz.* 378
acuminata, *Mast.* 379
glabra, *Turcz.* 379
moacurroides, *Bedd.* 379
Lepyrodiclis holosteoides, Fenzl. 241
tenera, Boiss. 242
Leucostemma latifolia, Benth. 231
Webbiana, Wall. 230
Leucoderis javanica, Planch. 605
Libanotus asiaticus, Stackh. 528
Libanus thurifera, Colebr. 528
Limacia, *Lour.* 100
Amherstiana, *Miers.* 100
cuspidata, *H. f. & T.* 100
distincta, Miers 100
inornata, Miers 100
oblonga, *Miers* 100
triandra, *Miers* 100
velutina, *Miers* 100
Wallichiana, Miers 100
Limonia, *Linn.* 507
acidissima, *Linn.* 507
alata, *W. & A.* 508
alternans, *Wall.* 508
alternifolia, Kurz 508
? *angustifolia*, Wall. 500
arborea, Roxb. 500
bilocularis, Roxb. 508
? *caudata*, Wall. 513
citrifolia, Roxb. 510
crenulata, Roxb. 507
diacantha, DC. 507
? *flavicans*, Wall. 508
grandiflora, Wall. 510
Laureola, DC. 499
leptostachya, Jack. 492
missionis, Wall. 510, 512, 513
missionis, Wight 513
mollis, Wall. 504
monophylla, Linn. 512
oblonga, Wall. 508, 510
oligandra, Dalz. 497
pentagyna, Roxb. 508
pentagyna, Roxb. 531
pentaphylla, Retz. 500

Page
? pubescens, *Wall.* 507
pusilla, Gærtn. 191
retusa, Don 508
scandens, Roxb. 509
trifoliata, Linn. 507
LINEÆ 409
Linum, *Linn.* 410
Cicanobum, *Don* 412
corymbulosum, Rchb. 411
humile, Mill. 411
humile, Heyne 411
mysorense, *Heyne* 411
perenne, *Linn.* 411
repens, Don 412
Stocksianum, Boiss. 411
strictum, *Linn.* 411
tetragynum, Colebr. 412
trigynum, Roxb. 412
trinervium, Roth. 410
trinervium, Hohenack. 411
usitatissimum, *Linn.* 410
Liriodendron liliifera, Roxb. 40
grandiflorum, Roxb. 41
Lœflingia indica, Retz 245
Lonchomera, *H. f. & T.* 93
leptopoda, *H. f. & T.* 94
Lophopetalum, *Wight* 614
celastroides, *Laws.* 615
dubium, *Laws.* 616
filiforme, *Laws.* 616
fimbriatum, *Wight* 615
floribundum, *Wight* 616
grandiflorum, Arn. 608
javanum, Turcz. 615
lucidum, Wight 608
ovatum, Presl. 615
pallidum, *Laws.* 615
reflexum, *Laws.* 616
Wallichii, *Kurz* 615
Wightianum, *Arn.* 615
Lophophyllum, *Griff.* 105
bicristatum, *Griff.* 105
Lophostylis javanica, Miq. 208
Loxostemon, *H. f. & T.* 139
pulchellus, *H. f. & T.* 139
? *Ludia fœtida*, Roxb. 192
Luvunga, *Ham.* 508
eleutherandra, *Dalz.* 509
eleutherandra, Thw. 509
scandens, *Ham.* 509
scandens, Thw. 509
Tavoyana, Lindl. 509
Lychnis, *Linn.* 222
apetala, *Linn.* 222
apetala, var. *gracilis*, *H. f. & T.* 223

Page
  brachypetala, *Hort. Berol.* 223
  Cachemeriana, *Royle* 224
  cancellata, *Jacq.* . 226
  ciliata, Wall. . . 225
  coronaria, *Lamk.* . 222
  cuneifolia, Royle . 226
  eriostemon, Wall. . 225
  Falconeri, Rohrb. . 223
  fimbriata, Wall. . . 225
  himalayensis, *Edgw.* 223
  indica, *Benth.* . . 225
  inflata, *Wall.* . . 225
  macrorhiza, *Royle* . 223
  madens, Jacq. . . 223
  multicaulis, *Wall.* . 224
  nigrescens, *Edgw.* . 223
  nutans, *Benth.* . . 225
  pilosa, *Edgw.* . . 226
  pumila, Royle . . 226
  Stewartii, *Edgw.* . 224
  tristis, H. f. & T. . 223
LYCHNIDEÆ 213

Macharisia icosandra, Planch. 416
Mackaya populifolia, Arn. 578
Macrolinum trigynum, Reichb. . . . 412
Mærua, *Forsk.* . . . 171
  arenaria, *H. f. & T.* 171
  ovalifolia, Camb. . 171
  scabra, Camb. . . 171
Magnolia, *Linn.* . . 41
  Campbellii, *H. f & T.* 41
  excelsa, Wall. . . 43
  globosa, *H. f. & T.* . 41
  Griffithii, *H. f. & T.* 41
  insignis, Wall. . . 42
  sphenocarpa, *Roxb.* . 41
MAGNOLIACEÆ . . . 38
MAGNOLIEÆ 39
Mahonia nepalensis, DC. 109
Malachium aquaticum, Fries 229
Malachra, *Linn.* . . 329
  capitata, *Linn.* . . 329
Malcolmia, *Br.* . . . 146
  africana, *Br.* . . . 146
  strigosa, *Boiss.* . . 146
  torulosa, *Boiss.* . . 146
  stricta, Camb. . . 149
Mallea integerrima, Wall. 545
  Rothii, Juss. . . . 545
  subscandens, Teysm. & Binn. . . . 545

Page
MALPIGHIACEÆ . . . 417
Malva, *Linn.* . . . 320
  alchemillæfolia, Wall. 320
  borealis, Wallm. . 320
  ciliata, Wall. . . 320
  malwensis, Edgw. . 319
  mauritiana, DC. . 320
  neilgherrensis, Wight 320
  parviflora, *Linn.* . 321
  parviflora, Huds. . 320
  rotundifolia, *Linn.* . 320
  rotundifolia, Roxb. 320
  silvestris, *Linn.* . . 320
  spicata, Linn. . . 321
  tricuspidata, Ait. . 321
  verticillata, *Linn.* . 320
  vulgaris, Fries . . 320
MALVACEÆ 317
MALVEÆ 318
Malvaviscus populneus, Gærtn. 345
Malvastrum, *A. Gray* 321
  spicatum, *A. Gray* . 321
  tricuspidatum, *A. Gray* 321
Mammea longifolia, Planch. & Tr. . . 270
  siamensis, T. Anders. 271
Mangifera glauca, Rotlh. 623
Manglietia, *Bl.* . . . 42
  Candollei, Wall. . 41
  Caveana, *H. f. & T.* 42
  insignis, *Bl.* . . . 42
Manungala pendula, Blanc. 519
Mappia, *Jacq.* . . . 588
  Championiana, Miers 589
  fœtida, *Miers* . . 589
  fœtida, Bedd. . . 589
  fœtida, var., Thw. . 589
  Gardneriana, Miers 589
  oblonga, *Miers* . . 589
  ovata, *Miers* . . . 589
  tomentosa, *Miers* . 589
  Wightiana, Miers . 589
Matthiola, *Br.* . . . 130
  odoratissima, *Br.* . 131
Meconopsis, *Vig.* . . 118
  aculeata, *Royle* . . 118
  Gul.-Waldemarii, Klotzsch. . . . 118
  horridula, *H. f. & T.* 118
  nipalensis, *DC.* . . 118
  robusta, *H. f. & T.* . 118
  simplicifolia, *H. f. & T.* 118

Page
  Wallichii, *Hook.* . 119
Medusa anguifera, Lour. 188
Meesia serrata, Gærtn. 525
Megabotrya meliæfolia, Hance 490
Megacarpæa, *DC.* . . 161
  bifida, *Benth.* . . 161
  polyandra, *Benth.* . 161
Melandryum apetalum, Rohrb. 222
  brachypetalum, Fenzl 224
  Falconeri, Rohrb. . 222
  Griffithii, Rohrb. . 220
  inflatum, Rohrb. . 225
  intrusum, Rohrb. . 226
  macrorhizum, Rohrb. 223
  multicaule, Rohrb. . 225
  nutans, Rohrb., 225, 226
Melhania, *Forsk.* . . 372
  abutiloides, Arn. . 373
  abutiloides, Aitch. . 373
  abyssinica, *A. Rich.* 372
  bracteosa, Boiss. . . 373
  cannabina, *Wight* . 372
  Denhami, *Br.* . . 373
  futtyporensis, *Munro* 373
  Hamiltoniana, *Wall.* 372
  Hamiltoniana, Munro 373
  incana, *Heyne* . . 372
  ovata, Boiss. . . . 372
  tomentosa, *Stocks* . 373
Melia, *Linn.* . . . 543
  æthiopica, Welw. . 545
  argentea, Hb. Ham. 545
  australasica, Juss. . 545
  Azadirachta, *Linn.* . 544
  Azedarach, *Linn.* . 544
  baccifera, Roth. . 545
  Bombolo, Welw. . . 545
  Bukayun, Royle . . 544
  composita, Willd. . 545
  dubia, *Cav.* . . . 545
  excelsa, *Jack.* . . 544
  indica, Brandis . . 544
  Koetjape, Burm. . 553
  montana, Hb. Madr. 545
  parviflora, Moon . 544
  penduliflora, Wall. . 550
  pumila, Moon. . . 543
  robusta, Roxb. . . 545
  sempervirens, Sw. . 544
  superba, Roxb. . . 545
  tomentosa, *Roxb.* . 543
? *tomentosa*, Kurz . 568
Meliacea penangiana, Wall. 569
  rugosa, Wall. . . 569

Page
singapureana, Wall. 555
Wightiana, Wall. 559
MELIACEÆ 540
Melianthus, *Tourn.* 697
himalayanus, Wall. 698
major, *Linn.* 698
Melicocca pubescens, DC. 681
trijuga, Juss. 681
Melicope, *Forst.* 491
? Helferi, *H. f.* 492
indica, *Wight* 492
tetrandra, Roxb. 491
MELIEÆ 540
Melochia, *Linn.* 373
affinis, Wall. 374
concatenata, Wall. 374
corchorifolia, *Linn.* 374
corchorifolia, Wall. 374
pauciflora, Wall. 374
pyramidata, Linn. 374
supina, Linn. 374
truncata, Willd. 374
truncata, Wall. 322
velutina, *Bedd.* 374
Melodorum, *Dun.* 78
bicolor, *H. f. & T.* 80
cylindricum, *Maing.* 80
elegans, *H. f. & T.* 82
fulgens, *H. f. & T.* 82
Griffithii, *H. f. & T.* 80
Kentii, H. f. & T. 82
lanuginosum, *H. f. & T.* 79
latifolium, *Dun.* 79
Maingayi, *H. f. & T.* 80
manubriatum, *H. f. & T.* 79
mollissimum, Miq. 79
pisocarpum, *H. f. & T.* 82
polyanthum, *H. f. & T.* 81
prismaticum, *H. f. & T.* 81
rubiginosum, *H. f. & T.* 79
rufinerve, *H. f. & T.* 81
verrucosum, *H. f. & T.* 80
Wallichii, *H. f. & T.* 81
Melothrix zeylanica, Kœn. 662
MENISPERMACEÆ 94
Menispermum acuminatum, Lamk. 99
cocculus, Linn. 98
cordifolium, Willd. 97

Page
crispum, Linn. 96
fenestratum, Gærtn. 99
heteroclitum, Roxb. 98
hirsutum, Linn. 101
laurifolium, Roxb. 101
malabaricum, Lamk. 96
myosotoides, Linn. 101
orbiculatum, Linn. 104
peltatum, Lamk. 104
polycarpum, Roxb. 99
radiatum, Lamk. 99
tomentosum, Roxb. 96
triandrum, Roxb. 100
tuberculatum, Lamk. 96
verrucosum, Roxb. 96
villosum, Lamk. 101
villosum, Roxb. 102
Mesua, *Linn.* 277
coromandeliana, Wight 277
ferrea, *Linn.* 277
? lepidota, *T. And.* 278
Nagana, Gardn. 277
nervosa, Pl. & Tr. 277
pedunculata, Wight 277
pulchella, Pl. & Tr. 277
Roxburghii, Wight 277
salicina, Pl. & Tr. 277
sclerophylla, Thw. 277
singaporiana, Wall. 276
speciosa, Chois. 277
speciosa, var., Thw. 278
Thwaitsii, *Pl. & Tr.* 278
Walkeriana, Pl. & Tr. 277
Michelia, *Linn.* 42
aurantiaca, Wall. 42
Cathcartii, *H. f. & T.* 42
Champaca, *Linn.* 42
Doldsopa, Ham. 42
excelsa, *Bl.* 43
glauca, Wight 44
Kisopa, *Ham.* 43
lactea, Wall. 43
lanuginosa, *Wall.* 43
macrophylla, Don 41
nilagirica, *Zenk.* 44
oblonga, *Wall.* 43
ovalifolia, Wight 44
Pulneyensis, Wight 44
punduana, H. f. & T. 43
Rheedii, Wight 42
rufinervis, DC. 42
velutina, DC. 43
Walkeri, Wight 44
Microchlæna flavescens, Garcke 371
quinquelocularis, W. & A. 371

Page
Microcos mala, Ham. 393
paniculata, Linn. 393
Stauntoniana, G. Don 393
tomentosa, Sm. 393
Microlæna spectabilis, Wall. 371
Micromelum, *Bl.* 501
hirsutum, *Oliv.* 502
pubescens, *Bl.* 501
Microtropis, *Wall.* 613
bivalvis, *Wall.* 614
coriacea, Wall. 625
densiflora, *Wight* 614
discolor, *Wall.* 614
latifolia, *Wight* 613
? *longifolia*, Wall. 613, 625
microcarpa, *Wight* 614
ovalifolia, *Wight* 614
ramiflora, *Wight* 613
Wallichiana, *Wight* 613
Miliusa, *Leschen.* 86
indica, *Leschen.* 86
macrocarpa, *H. f. & T.* 86
montana, Gardn. 86
nilagirica, *Bedd.* 87
Roxburghiana, *H. f. & T.* 87
velutina, *H. f. & T.* 87
Wallichiana, H. f. & T. 87
Wightiana, *H. f. & T.* 87
zeylanica, *Gard.* 87
MILIUSEÆ 47
Milnea apiocarpa, Thw. 555
edulis, Roxb. 556
Roxburghiana, W. & A. 555
Roxburghii, Wight 555
Miquelia, *Meissn.* 593
assamica, Bl. 593
dentata, *Bedd.* 593
? gibba, *Baill.* 594
Kleinii, *Meissn.* 593
Mischocarpus sumatranus, Bl. 679
sundaicus, Bl. 678
Mitrephora, *Bl.* 76
? excelsa, *H. f. & T.* 77
grandiflora, *Bedd.* 78
Heyneana, *Thw.* 77
Maingayi, *H. f. & T.* 77
obtusa, *Bl.* 76
reticulata, *H. f. & T.* 77
tomentosa, *H. f. & T.* 76
MITREPHOREÆ 46
Moacurra gelonioides, Roxb. 570
Modeccopsis vaga, Griff. 578

Page
Molina racemosa, Lamk. 418
Molinæa canescens, Roxb. 671
Mollia corymbosa, Willd. 245
spadicea, Willd. . . 245
Monetia tetracantha, Don 425
Monocera * *elliptica*, Turcz.
ferrugineus, Wight 406
ferruginea, Jack. . 409
glandulifera, Hook. 407
Griffithii, C. Müll. . 407
Griffithii, Wight . . 408
† *holopetala*, Turcz. . 408
† *macrocera*, Turcz. . 405
Munroii, *Wight* . . 407
petiolata, Jack. . . 408
Roxburghii, Wight. 405
subintegerrima, Miq. 405
trichanthera, *Griff.* . 408
tuberculata, W. & A. 405
Walkerii, Wight . . 406
Monoceras leucobotryum, Miq. 407
petiolatum, Miq. . 408
Monocyclis robusta, Wall. 565
Monoporandra, *Thw.* . 316
cordifolia, *Thw.* . . 317
elegans, *Thw.* . . 317
Monosoma littorata, Griff. 567
Monsonia, *Linn* . . 427
chumbalensis, Wight 427
heliotropioides, *Cav.* 428
Lawiana, *Stocks*. . 427
mallica, Edgw. . . 428
senegalensis, *Guill. & Perr.* . 427, 435
Moricandia, *DC.* . . 158
arvensis, *DC.* . . 158
tortuosa, *H. f. & T.* 158
Moulinsia cupanioides, Camb. 672
rubiginosa, G. Don . 672
Munnicksia, Dennstd. 196
Murraya, *Linn.* . . 502
brevifolia, Thw. . . 503
Burmanni, Spr. . . 504
elongata, A. DC. . 503
exotica, *Linn.* . . 502

Page
exotica, Thw. . . 503
exotica, Reinw. . . 554
Glenieii, Thw. . . 503
Kœnigii, *Spr.* . . 503
paniculata, Jack. . 503
sumatrana, Roxb. . 503
Munronia, *Wight* . . 542
neilgherrica, Wight 543
pumila, *Wight* . . 543
Wallichii, *Wight* . 543
Myricaria, *Desv.* . . 249
bracteata, Royle . . 250
elegans, *Royle* . . 250
germanica, *Desv.* . 250
Hoffmeisteri, Klotzsch 250
prostrata, Benth. & H. f. 250
vaginata, Desv. . . 249
Myristica Finlaysoniana, Wall. . 82
Myxospermum chylocarpum, Rœm. . 500

Naravelia, *DC.* . . . 6
Finlaysoniana, Wall. 7
laurifolia, *Wall.* . . 7
zeylanica, *DC.* . . 7
Naregamia, *W. & A.* . 542
alata, *W. & A.* . . 542
dentata, Miq. . . 542
Nasturtium, *Br.* . . 133
heterophyllum, Don . 133
indicum, *DC.* . . 134
madagascariense, W. & A. 134
montanum, *Wall.* . 134
officinale, *Br.* . . 133
palustre, *DC.* . . 133
terrestre, Br. . . . 133
Natsiatum, *Ham.* . . 595
gamosepalum, Griff. 595
herpeticum, *Ham.* . 595
oppositifolium, Pl. . 596
Neerija dichotoma, Roxb. 623
Neesia, *Bl.* 352
synandra, *Mast.* . . 352
NELUMBIEÆ 113
Nelumbium, *Juss.* . . 115
asiaticum, Rich. . . 116
speciosum, *Willd.* . 116
Nelumbo indica, Poir. 116
Nemedra Nimmonii, Dalz. 561

Page
Nephelium, *Linn.* . . 686
bengalense, G. Don. . 689
bifoliolatum, Thw. . 684
costatum, *Hiern* . . 688
dimocarpus, Hb. Ind. Or. . . . 688
duriocarpus, T. And. 688
echinatum, *Noronh.* 687
erectum, Thw. . . 683
eriopetalum, *Miq.* . 689
eximium, Thw. . . 691
fuscatum, Thw. . . 682
Gardneri, *Thw.* . . 690
glabrum, *Noronh.* . 687
Griffithiana, Kurz . 687
hypoleucum, Kurz . 689
lappaceum, *Linn.* . 687
Lit-chi, *Camb.* . . 687
Longana, *Camb.* . . 688
? Maingayi, *Hiern* . 688
malaiense, *Griff.* . 689
mora, Gardn. . . 689
mutabile, *Bl.* . . 686
Noronhianum, *Camb.* 686
pupillum, Wight . 689
rimosum, G. Don . 690
rubescens, *Hiern* . 688
rubrum, G. Don . . 684
simplicifolium, Thw. 683
stipulaceum, *Bedd.* . 690
variabile, Wall. . . 691
verticillatum, G. Don 684
xerocarpum, Camb. 686
Nephroica mollis, Miers 102
Neslia, *Desv.* . . . 164
paniculata, *Desv.* . 164
‡*Neuroloma nudicaule*, DC. 131
scapigerum, DC. . . 131
Niebuhria, *DC.* . . . 171
arenaria, DC. . . 171
linearis, *DC.* . . 171
oblongifolia, Royle . 171
Nima quassioides, Ham. mss. . . . 520
Nimmonia Lawii, Wight 561
Niota Lamarckiana, Bl. 519
lucida, Wall. . . . 519
pentapetala, Poir. . 519
tetrapetala, Lamk. . 519
Norisca mysorensis, Wight 253

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* A synonym of Elæocarpus varunua, Ham., omitted in text.
† Incorrectly quoted as of Zollinger in text.
‡ Not *Neurotoma*, as quoted at p. 131.

Page
Notoceras, *Br.* . . . 140
  canariense, *Br.* . . 140
  hispanicum, DC. . 140
Nothocnestis sumatrana, Miq. 622
Nymphæa, *Linn.* . . 114
  alba, *Linn* . . . 114
  Cachemiriana, Camb. 114
  cyanea, Roxb. . . 114
  Devoniensis, Hook. . 114
  Edgeworthii, Lehm. 114
  edulis, DC. . . . 114
  Hookeriana, Lehm. 114
  lotus, *Linn.* . . . 114
  Nelumbo, Linn. . . 116
  punctata, Edgw. . 114
  pubescens, *Willd.* . 114
  pygmæa, *Ait.* . . 115
  rubra, Roxb. . . 114
  sagittata, Edgw. . 114
  stellata, *Willd.* . . 114
  stellata, Willd. (W. & A.) 114
  versicolor, Roxb. . 114
NYMPHÆACEÆ . . . 113
NYMPHEÆ 113

Ochanostachys, *Mast.* . 576
  amentacea, *Mast.* . 577
Ochna, *Linn.* . . . 523
  andamanica, Kurz . 524
  ? brevipes, *Planch.* . 525
  collina, Edgw. . . 524
  cordata, Thw. . . 524
  crocea, Griff. . . 525
  fruticulosa, Kurz . 524
  Heyneana, W. & A. 524
  humilis, Wall. . . 524
  lucida, Lamk. . . 523
  Moonii, Thw. . . 524
  nana, Ham. . . . 524
  nitida, Thunb. . . 523
  nitida, Wall. . . . 524
  obtusata, DC. . . 523
  parviflora, Griff. . . 524
  parvifolia, Vahl ? . 524
  pumila, *Ham.* . . 524
  rufescens, ? Thunb. 523
  squarrosa, *Linn.* . 523
  squarrosa, Kurz . 524
  stipulacea, ? Colebr. 524
  Walkerii, Planch. . 524
  Wallachii, *Planch.* . 524
  Wightiana, *Wall.* . 524
  zeylanica, Lamk. . 525
OCHNACEÆ 523
OCHNEÆ 523
Ochradenus, *Del.* . . 182

Page
  baccatus, *Del.* . . 182
Ochrocarpus, *Thouars* . 270
  longifolius, *Benth.* . 270
  siamensis, *T. And.* . 270
OLACEÆ 573
OLACINÆ 572
Olax, *Linn.* 574
  acuminata, *Wall.* . 576
  Bador, Ham. . . 575
  Heyneana, Wall. 576, 586
  imbricata, *Roxb.* . . 575
  longifolia, Wall. 576, 586
  lucida, Heyne . . 575
  merguensis, *Planch.* 576
  nana, *Wall.* . . . 576
  psittacorum, Vahl . 575
  scandens, *Roxb.* . . 575
  ? *sumatrana*, Miq. . 582
  Wightiana, *Wall.* . 575
  zeylanica, *Linn.* . . 576
  zeylanica, Wall. . . 575
Oleoxylon balsamiferum, Wall. . . 298
Oligomeris, *Camb.* . . 181
  glaucescens, *Camb.* . 181
Opilia, *Roxb.* . . . 583
  acuminata, Wall. . 583
  amentacea, *Roxb.* . 583
  amentacea, Wall. . 582
  javanica, Miq. . . 584
  odorata, Spr. . . 554
OPILIEÆ 573
Oraoma canarana, Turcz 560
Ornitrophe allophyllus, Pers 673
  aporetica, Roxb. . 674
  asiatica, Hort. . . 674
  Cobbe, Willd. . . 673
  glabra, Roxb. . . 674
  malabarica, Hb. Madr. 674
  Schmiedelia, Pers. . 674
  serrata, Roxb. . . 674
  villosa, Roxb. . . 674
Orophea, *Bl.* . . . 90
  acuminata, *A. DC.* . 91
  Brandisii, *H. f. & T.* 91
  coriacea, Thw. . . 93
  enterocarpa, *Maing. mss.* 92
  erythrocarpa, *Bedd.* 91
  Heyneana, H. f. & T. 77
  ? *obliqua*, H. f. & T. 93
  polycarpa, A. DC. . 91
  Thomsoni, *Bedd.* . 91
  uniflora, *H. f. & T.* 90
  zeylanica, *H. f. & T.* 90

Page
Otonychium imbricatum, Bl. . . . 692
Otophora, *Bl.* . . . 680
  erythrocalyx, *Hiern* 680
  fruticosa, Bl. . . 680
  paucijuga, *Hiern* . 680
Ottilis zeylanica, Gærtn. 667
Oudemansia integerrima, Miq. . . 365
OXALIDEÆ 426
Oxalis, *Linn.* . . . 435
  Acetosella, *Linn.* . 436
  corniculata, *Linn.* . 436
  gracilenta, Kurz. . 438
  Griffithii, *Edgw. & H. f.* 436
  Metziana, Miq. . . 438
  Petersii, Klotzsch . 437
  pusilla, Salisb. . . 436
  Reinwardtii, Zucc. 437, 438
  repens, Thunb. . . 436
  sensitiva, Zucc. . . 437
  sensitiva, Linn. . . 438
  sensitivum, Hb. Wight 439
  sessilis, Ham. . . 437
Oxycarpus gangetica, Ham. 262
Oxygraphis, *Bunge* . 21
  glacialis, *Bunge* . . 21
  polypetala, *H. f. & T.* 21
Oxymitra, *Bl.* . . . 70
  affinis, *H. f. & T.* . 70
  filipes, *H. f. & T.* . 71
  fornicata, *H. f. & T.* 71
  glauca, *H. f. & T.* . 71
  latifolia, *H. f. & T.* 70
  Maclellandii, *H. f. & T.* 70
  macrophylla, A. DC. 73
  stenopetala, *H. f. & T.* 71
  unonæfolia, *H. f. & T.* 71

Pachygone, *Miers* . . 105
  adversa, Miers . . 105
  concinna, Miers . . 105
  odorifera, Miers . . 105
  ovata, *Miers* . . . 105
  Plukenetii, Miers . 105
PACHYGONEÆ . . . 95
Pæonia, *Linn.* . . . 30
  emodi, *Wall.* . . . 30
  officinalis, H. f. & T. 30
PÆONIEÆ 2
PANGIEÆ 189
Papaver, *Linn.* . . . 116
  amœnum, Lindl. . 117

Page

- Argemone, *Linn.* . 117
  - dubium, *Linn.* . 117
  - *glabrum*, Royle . 117
  - hybridum, *Linn.* . 117
  - nudicaule, *Linn.* . 117
  - orientale, *Linn.* . 117
  - *paniculatum*, Don . 119
  - Rhœas, *Linn.* . 117
  - *simplicifolium*, Don. 118
  - somniferum, *Linn.* . 117
- PAPAVERACEÆ . 116
- *Papeda Rumphii*, Cat. Hort. Bog. . 515
- Parabæna, Miers . 95
  - *ferruginea*, Miers . 96
  - *heterophylla*, Miers . 96
  - *oleracea*, Miers . 96
  - sagittata, *Miers* . 96
- *Paracelastrus bivalvis*, Miq. . 614
- Paramigyna, *Wight* . 509
  - armata, *Oliv.* . 511
  - citrifolia, *H. f.* . 510
  - *citrifolia*, Oliv. . 510
  - grandiflora, *Oliv.* . 510
  - Griffithii, *H. f.* . 510
  - longispina, *H. f.* . 511
  - monophylla, *Wight* . 510
- *Parartabotrys sumatrana*, Miq. . 83
- *Parashorea stellata*, Kurz. . 304
  - *longisperma*, Kurz. . 308
- *Paritium gangeticum*, Don . 345
  - *tiliaceum*, W. & A. . 343
  - *tricuspe*, G. Don . 344
- *Paronychia subulata*, Lamk. . 245
- Parrya, *Br.* . 131
  - exscapa, *Mey.* . 131
  - lanuginosa, *H. f. & T.* 132
  - macrocarpa, *Br.* . 131
  - platycarpa, *H. f. & T.* 131
- Parvatia, *Dcne.* . 108
  - Brunoniana, *Dcne.* . 108
- *Patonia parvifolia*, Wight . 84
  - *Walkeri*, Wight . 84
- *Paullinia asiatica*, L. 497
- *Pavia*, see Æsculus . 675
- Pavonia, *Cav.* . 330
  - *acerifolia*, Lk. & Otto 338
  - arabica, *Hochst.* . 331
  - ceratocarpa, Dalz. . 331
  - glechomifolia, *A. Rich.* 330
  - *grewioides*, Hochst. . 332
  - odorata, *Willd.* . 331
  - *procumbens*, Boiss. . 330
  - propinqua, *Garcke* . 332
  - *repanda*, Spr. . 330
  - *Romb rua*, Wall. . 331
  - *rosea*, Wall. . 331
  - *sidoides*, Horn. . 331
  - zeylanica, *Cav.* . 331
- Peganum, *Linn.* . 486
  - Harmala, *Linn.* . 486
- *Pelargonium grossularioides* . 435
- Pentace, *Hassk.* . 381
  - burmannica, *Kurz.* . 381
  - triptera, *Mast.* . 382
- *Pentacme siamensis*, A. DC. . 304
  - *suavis*, A. DC. . 304
- *Pentaglottis suberifolia*, Wall. . 369
- *Pentaloba ? bengalensis*, Wall. . 186
  - *macrophylla*, Wall. 187
  - *zeylanica*, Arn. . 187
- Pentapetes, *Linn.* . 371
  - *acerifolia*, Cav. . 368
  - phœnicea, *Linn.* . 371
  - *suberifolia*, Linn. . 367
  - *tomentosa*, Wall. (for Pentaglottis tomentosa) . 373
- *Peraphora robusta*, Miers . 105
- *Pereira medica*, Lindl. 99
- *Periandra cœspitosa*, Camb. . 243
- Pericampylus, *Miers* . 102
  - incanus, *Miers* . 102
- *Peripterygium quinquelobum*, Hassk. . 597
- Phæanthus, *H. f. & T.* 72
  - malabaricus, *Bedd.* . 70
  - nutans, *H. f. & T.* . 70
- *Pharnaceum depressum*, Linn. . 245
- *Philagonia fraxinifolia*, Hook. . 490
  - *procera*, DC. . 490
  - ? *sambucina*, Bl. . 490
- Phlebocalymna, *Griff.* . 589
  - Griffithiana, *Mast.* . 590
  - Lobbiana, *Mast.* . 590
- *Phoberos acuminatus*, Thw. . 191
  - *Arnottianus*, Thw. . 191
  - *crenatus*, W. & A. . 191
  - *Hookerianus*, Thw. . 191
  - *lanceolatus*, W. & A. 191
  - *macrophyllus*, W. & A. 190
  - *Rhinanthera*, Benn. 190
  - *Roxburghii*, Benn. . 190
  - *Wightianus*, W. & A. 191
- Physorhyncus, *Hook.* . 165
  - brahvicus, *Hook.* . 165
  - *chamærapistrum*, Boiss. . 165
- Phytocrene, *Wall.* . 591
  - bracteata, *Wall.* . 592
  - *callicarpa*, Griff. . 591
  - gigantea, *Wall.* . 591
  - *macrocarpa*, Griff. . 592
  - oblonga, *Wall.* . 592
  - palmata, *Wall.* . 592
  - *stylocarpa*, Griff. . 592
- PHYTOCRENEÆ . 573
- PICRAMNIEÆ . 517
- Picrasma, *Bl.* . 520
  - andamanica, *Kurz* . 520
  - javanica, *Bl.* . 520
  - nepalensis, *Benn.* . 520
  - quassioides, *Benn.* . 520
- *Pierotia lucida*, Bl. . 416
- *Pilotrichum canescens*, C. A. Mey. . 141
  - *elongatum*, C. A. Mey. 141
- *Piptosylis indica*, Dalz. 505
- PITTOSPOREÆ . 197
- Pittosporum, *Banks* . 197
  - Ceylanicum, *Wight* . 199
  - dasycaulon, *Miq.* . 199
  - ? *densiflorum*, Putterl. 199
  - eriocarpum, *Royle* . 199
  - ferrugineum, *Ait.* . 199
  - *ferrugineum*, Putterl. 200
  - floribundum, *W. & A.* 199
  - glabratum, *Lindl.* . 198
  - humile, *H. f. & T.* . 193
  - nilghirense, *W. & A.* 198
  - *Rumphii*, Putterl. . 200
  - tetraspermum, *W. & A.* . 198
- Pityranthe, *Thw.* . 382
  - verrucosa, *Thw.* . 382
- Plagiopteron, *Griff.* . 399
  - fragrans, *Griff.* . 399
- *Plagiotaxis Chickrassia*, Wall. . 568
  - *grandiflora*, Wall. . 552
  - *velutina*, Wall. . 568
- *Platea axillaris*, Thw. 586
  - *Griffithiana*, Miers . 590
  - *Lobbiana*, Miers . 590
  - *Wightiana*, Miers . 586
- *Platynema laurifolium*, W. & A. . 418
- Pleurostylia, *Wight* . 617
  - *Heynei*, W. & A. . 617

Page
Wightii, *W. & A.* . 617
Ploiarium elegans, Korth. 294
Pœciloneuron, *Bedd.* . 278
indicum, *Bedd.* . . 278
pauciflorum, *Bedd.* . 278
Podophyllum, *Linn.* . 112
emodi, *Wall.* . . 112
hexandrum, Royle . 112
Polanisia burtporensis, Munro 169
chelidonii, DC. . . 170
dodecandra, DC. . 170
felina, DC. . . . 170
heterophylla, Wall. . 170
icosandra, W. & A. . 170
Leschenaultii, DC. . 170
Schraderi, DC. . . 170
simplicifolia, Camb. 169
viscosa, DC. . . . 170
Polyalthia, *Bl.* . . . 62
? aberrans, *Maing.* . 67
acuminata, *Thw.* . 63
argentea, *H. f. & T.* 67
bifaria, *Benth & H. f.* 62
biglandulosa, *Benth. & H. f.* . . . 65
cardiopetala, Dalz. . 75
cauliflora, *H. f. & T.* 66
cerasoides, *Benth. & H. f.* 63
cinnamomea, *H. f. & T.* 65
coffeoides, *Benth. & H. f.* 62
costata, *H. f. & T.* . 67
fragrans, *Benth. & H. f.* 63
fruticans, A. DC. . 51
hypoleuca, *H. f. & T.* 63
Jenkinsii, *Benth. & H. f.* 64
Korinti, *Benth. & H. f.* 64
longifolia, *Benth. & H. f.* 62
macrophylla, *H. f. & T.* 66
macrophylla, Bl. . 74
magnoliæflora, *Main.* 64
Moonii, *Thw.* . . . 66
nitida, *Benth. & H. f.* 64
obliqua, *H. f. & T.* 67
persicæfolia, *Benth. & H. f.* . . . 66
rufescens, *H. f. & T.* 66
sclerophylla, *H. f. & T.* 65

Page
simiarum, *Benth. & H. f.* 63
suberosa, *Benth. & H. f.* 65
Polycarpæa, *Lamk.* . 245
corymbosa, *Lamk.* . 245
densiflora, Wall. . 245
diffusa, *W. & A.* . 245
indica, Lamk. . . 245
spadicea, Lamk. . 245
spicata, *W. & A.* . 246
staticæformis, Hochst. & Steud. . . . 246
POLYCARPEÆ . . . 213
Polycarpon, *Linn.* . . 244
Benthamii, Wall. . 245
depressa, DC. . . 245
lanuginosa, Wall. . 245
Lœflingiæ, *Benth. & H. f.* 245
Polygala, *Linn.* . . 200
abyssinica, *Fresen.* . 202
arillata, *Ham.* . . 200
Arnottiana, Steud. 204
Arnottiana, Hassk. 207
arvensis, Willd. . . 204
brachystachya, DC. . 204
brachystachya, Bl. . 204
Buchanani, Ham. . 203
buxiformis, Hassk. . 205
campestris, Dalz. . 203
canarana, Hassk. . 207
ceylanica, Heyne . 201
chinensis, *Linn.* . . 204
ciliata, Hb. Wight . 204
ciliata, Linn. . . 207
confusa, Hassk. . . 203
crotalarioides, *Ham.* 201
densiflora, Bl. . . 206
depauperata, Wall. . 206
discolor, Ham. . . 202
elegans, Wall. . . 205
elongata, *Klein* . . 203
erioptera, *DC.* . . 203
eumekes, Hassk. . . 204
exigua, Hassk. . . 204
furcata, Royle . . 201
Gerardiana, Wall. . 202
glabra, Heyne . . 204
glaucescens, Wall. . 201
glaucoides, *Linn.* . 203
glaucoides, Wight . 204
glomerata, *Lour.* . 206
glomerata, Thw. . . 205
grandiflora, Hb. Wight 204
granulata, Hassk. . 203
Heyneana, Wall. . 205

Page
hirsutula, Arn. . . 203
Hohenackeriana, *Fisch. & Mey.* . 202
hypoglauca, Hassk. 203
hyalina, Wall. . . 201
japonica, Houtt. . 205
javana, *DC.* . . . 201
Khasiana, Hassk. . 205
Kleinii, Hassk. . . 204
leptalea, *DC.* . . 202
linarifolia, *Willd.* . 206
linarifolia, Heyne . 204
macrolophos, Hassk. 205
macropetala, *Hassk.* 206
macrostachya, Hassk. 204
monopetala, Camb. . 205
multibracteata, Wall. 204
myrsinites, Royle . 205
obtusata, DC. . . 203
oligophylla, DC. . 202
pedunculosa, Thw. . 205
persicariæfolia, *DC.* 202
procumbens, *Roxb.* . 206
procumbens, Roxb. . 204
prostrata, Willd. . 204
ramosa, Hb. Wight. 204
rosmarinifolia, *W. &* 204
A. 204
Rothiana, W. & A. . 204
scabra, Edgw. . . 202
serpyllifolia, Poir. . 205
sibirica, *Linn.* . . 205
telephioides, *Willd.* 205
tinctoria, Vahl . . 201
tomentosa, Vahl . 203
Tranquebarica, Wight 204
Tranquebarica, Mart. 204
triflora, Oliv. . . 203
triflora, Hassk. . . 204
triflora, Linn. . . 204
triphylla, *Ham.* . 201
umbrosa, *Mart.* . . 206
Vahliana, DC. . . 203
varians, *Mart.* . . 206
vulgaris, Thunb. . 205
Wallichiana, Wight 203
Wightiana, Wall. . 203
Polyspora axillaris, Chois. 282
Pomaderris capsularis, G. Don . . . 642
Pometia, J. R. & G. Forst. 691
eximia, H.f. (Bedd.) 691
tomentosa, *Kurz* . 691

Page
  ternata, G. Forst. 674, 691
Popowia, *Endl.* . . . 68
  Beddomeana, *H. f. & T.* 68
  fœtida, *Maing.* . . 69
  Helferi, *H. f. & T.* . 69
  nervifolia, *Maing.* . 69
  pauciflora, *Maing.* . 69
  ramosissima, *H. f. & T.* 68
  ramosissima, Bedd. 68
  tomentosa, *Maing.* . 70
Portulaca, *Linn.* . . 246
  cristata, Ham. . . 247
  foliosa, Ker. . . 247
  geniculata, Royle . 247
  lævis, Ham. . . . 246
  meridiana, Linn. . 247
  napiformis, F. Muell. 247
  oleracea, *Linn.* . . 246
  pilosa, Hb. Madr. . 247
  quadrifida, *Linn.* . 247
  suffruticosa, *Wight* . 247
  suffruticosa, Thw. . 246
  tuberosa, *Roxb.* . . 247
  Wightiana, *Wall.* . 247
PORTULACEÆ . . . 246
Prinos cymosa, Hassk. 605
  spicata, Miq. . . 598
Protium, *W. & A.* . . 530
  caudatum, *W. & A.* 530
  gileadense, W. & A. 530
  pubescens, *W. & A.* 530
  Roxburghiana, W.&A. 530
Pseudehretia umbellata, Turcz. . . 604
Pseuduvaria reticulata, Miq. 77
Pteleocarpa, *Oliv.* . . 591
  malaccensis, *Oliv.* . 591
Pteridophyllum decipiens, Thw. . . 539
Pterisanthes, *Bl.* . . 663
  cissoides, *Bl.* . . 664
  heterantha, *Griff.* . 664
  pedata, *Laws.* . . 664
  polita, *Miq.* . . . 663
Pterocymbium javanicum, Br. . . . 362
Pterospermum, *Schreb.* 366
  acerifolium, *Willd.* . 368
  acerifolium, Zoll. & Moric. 367
  aceroides, Wall. . 368
  canescens, Roxb. . . 367
  diversifolium, *Bl.* . 367
  glabrescens, *W. & A.* 369

Page
  Heyneanum, *Wall.* . 369
  Jackianum, *Wall.* . 367
  lanceæfolium, *Roxb.* 368
  Lawianum, Nimmo . 369
  oblongum, Wall. . . 367
  obtusifolium, *Wight* 369
  reticulatum, *W. & A.* 369
  rubiginosum, *Heyne* 368
  semisagittatum, *Ham.* 368
  suberifolium, *Lamk.* 367
  suberifolium, Willd. 369
Pterygota, alata, Br. . 360
  alata, Thw. . . . 361
  Roxburghii, Schott & Endl. . . . 360
Pycnarrhena, *Miers* . 105
  mecistophylla, Miers 106
  planiflora, H. f. & T. 106
  pleniflora, *Miers* . 106
Pyramidanthe rufa, Miq. 81
Pyrenaria, *Bl.* . . . 289
  acuminata, *Planch.* 290
  attenuata, *Seem.* . 290
  barringtoniæfolia, *Seem.* 290
  camelliæflora, *Kurz.* 290
Pyrospermum calophyllum, Miq. . . . 622

Quinio cocculoides, Schlechtd. . . . 101

RANUNCULACEÆ . . . 1
RANUNCULEÆ . . . 1
Ranunculus, *Linn.* . 16
  acris, Linn. . . . 19
  affinis, *Br.* . . . 18
  amœnus, Ledeb. . . 18
  aquatilis, *Linn.* . . 16
  aquatilis, Don . . 16
  arvensis, *Linn.* . . 20
  attenuatus, Royle . 18
  auricomus, Linn. . 19
  brevirostris, Edgw. . 19
  bulbosus, Linn. . . 21
  cabulicus, Boiss. . 20
  cæspitosus, Wall. . 18
  chærophyllos, *Linn.* 18
  chinensis, Bunge . 19
  chooreensis, Royle . 18
  Cymbalariæ, Pursh. 17
  dahuricus, Turcz. . 18
  diffusus, *DC.* . . 19
  distans, Royle . . 19
  falcatus, *Linn.* . . 16
  fibrosus, Wall. . . 19
  flaccidus, *H. f. & T.* 20

Page
  Flammula, Don . 17
  geranioides, Bl. . . 19
  glabratus, Royle . 18
  hastatus, Walk. . . 17
  hirtellus, *Royle* . . 18
  hydrocotyloides, Wall. 19
  hyperboreus, *Rottb.* 18
  hyperboreus, H. f. & T. 18
  indicus, Roxb. . . 19
  javanicus, Bl. . . 17
  lætus, *Wall.* . . 19
  Lingua, *Linn.* . . 16
  lobatus, *Jacq.* . . 17
  longicaulis, C.A.Mey. 17
  membranaceus, Royle 17
  mollis, Wall. . . . 19
  muricatus, *Linn.* . 20
  napaulensis, DC. . 19
  natans, C. A. Mey. 18
  nephelogenes, Edgw. 17
  nervosus, Royle . . 18
  nivalis, *Linn.* . . 19
  obtectus, Wall. . . 19
  pedatifidus, Sm. . 18
  pedatifidus, Ledeb. 18
  pennsylvanicus, *Linn.* 19
  pimpinelloides, Don 14
  pinnatus, Wight . 20
  polypetalus, Royle . 21
  pulchellus, *C. A. Mey.* 17
  Purshii, Hook. . . 18
  pygmæus, Vahl. . . 18
  radicans, H. f. & T. 18
  radicans, C. A. Mey. 18
  reniformis, *Wall.* . 16
  riparius, Edgw. . . 19
  sagittifolius, *Hook.* . 17
  salsuginosus, Wall. . 17
  salsuginosus, Don. . 17
  sceleratus, *Linn.* . 19
  subpinnatus, W. & A. 19
  trilobatus, Don . . 19
  tuberculatus, DC. . 20
  vestitus, Wall. . . 21
  vitifolius, Royle . 19
  Wallichianus, *W. & A.* 20
RAPHANEÆ 130
Raphanus, *Linn.* . . 166
  caudatus, Linn. . 166
  Raphanistrum, Linn. 166
  sativus, *Linn.* . . 166
Ratonia Lessertiana, Benth. & H. f. . 678
Reevesia, *Lindl.* . . 363
  pubescens, *Mast.* . 364
  Wallichii, *Br.* . . 364

Page
Reinwardtia, *Dumort.* 411
indica, Dumort. . 412
repens, Planch. . . 412
tetragyna, *Planch.* . 412
trigyna, *Planch.* . 412
trigyna, Dalz.&Gibs. 412
Reseda, *Linn.* . . 181
Aucheri, *Boiss.* . . 181
bracteata, Boiss. . 181
nilgherrensis, J. Mull. 181
oligandra, Edgw. . 181
pruinosa, *Del.* . . 181
RESEDACEÆ 180
Retinodendron lanceæfolium, Korth. . 302
Rhamnea ? diospyrifolia, Wall. . . 642
? *lucida*, Wall. . . 641
RHAMNEÆ 629
Rhamnus, *Linn.* . . 638
acuminata, Colebr. 642
Arnottianus, *Gardn.* 638
circumscissus, Linn.f. 641
dahuricus, *Pall.* . 639
filiformis, Roth. . 641
? *glabratus*, Hb. Heyne. 636
globosus, Bunge . . 639
hirsutus, W. & A. . 639
Jujuba, Linn. . . 632
lineatus, Linn. . . 638
lucidus, Roxb. . . 641
myrtinus, Burm. . 641
Napeca, Linn. . . 635
nipalensis, *Wall.* . 640
nummularia, Burm. 633
Œnoplia, Linn. . 634
parviflorus, Klein . 641
parvifolius, Turcz. . 639
persicus, *Boiss.* . . 638
polymorphus, Turcz. 639
procumbens, *Edgw.* 640
purpureus, *Edgw.* . 639
rupestris, Royle . . 640
theezans, Linn. . . 641
trigynus, Don . . 641
triqueter, *Wall.* . . 639
virgatus, Roxb. . . 639
Wightii, *W. & A.* . 639
xylopyrus, Retz . 634
Rhaptomeris Burmanni Miers 104
Rhesa Moja, Ham. . 622
paniculata, Arn. . 622
Rhus Cobbe, Linn. . 673
decipiens, W. & A. . 540
fraxinifolium, Don 490

Page
Riedleia concatenata, DC. 374
corchorifolia, DC. . 374
supina, DC. . . . 374
tiliæfolia, DC. . . 374
truncata, W. & A. . 374
Rissoa zeylanica, Arn. 512
Ropalopetalum uniflorum, Griff. . . 55
Roucheria, *Planch.* . 413
Griffithiana, *Planch.* 414
Roumea hebecarpa, Gardn. 195
Roxburghia baccata, Kœn. 575
Roydsia, *Roxb.* . . 180
floribunda, Planch. 409
obtusifolia, *H. f. & T.* 180, 409
parviflora, *Griff.* 180, 409
suaveolens, *Roxb.* . 180
Ruta, *Linn.* . . . 485
albiflora, Hook. . 486
angustifolia, Pers. . 485
chalepensis, Wall. . 485
graveolens, Linn. . 485
japonica, Sieb. . . 486
tuberculata, *Forsk.* . 485
RUTACEÆ 484
RUTEÆ 484

Saccopelatum, *Benn.* . 88
longiflorum, *H. f. & T.* 88
? sclerocarpum, *H. f. & T.* 88
tomentosum, *H. f. & T.* 88
Scælanthus quadragonus, Forsk. 645
Sageræa Dalzellii, Bedd. 93
elliptica, H.f. & T. . 92
laurina, Dalz. . . 93
Thwaitesii, H. f. & T. 92
Segeretia, *Brongn.* . 641
Brandrethiana, *Aitch.* 642
corymbosa, G. Don . 642
filiformis, G. Don . 641
hamosa, *Brongn.* . 641
oppositifolia, *Brougn.* . . . 641
theezans, *Brongn.* . 641
theezans, Brandis . 642
Sagina, *Linn.* 242
ammannioides, Wall. 251
Linnæi, Presl. . . 243
procumbens, *Linn.* . 242

Page
saxatilis, Wimmer. 243
Salacia, *Linn.* 625
Brunoniana, *W. & A.* 626
? *chinensis*, Linn. . 627
? *cochinchinensis*, Lour. 627
densiflora, Wall. . 629
diandra, Thw. . . 627
Finlaysonii, Wall. . 627
flavescens, *Kurz* . 625
floribunda, *Wight* . 629
fruticosa, *Heyne* . 628
grandiflora, *Kurz* . 626
Griffithii, *Laws.* . 628
lævigata, Wight . . 624
latifolia, *Wall.* . . 629
Lobbii, *Laws.* . . 626
longifolia, *H. f.* . . 626
longifolia, Wall. . 629
macrosperma, *Wight* 628
Maingayi, *Laws.* . 626
membranacea, *Laws.* 627
memecyloides, Wall. 628
multiflora, *Wight* . 627
oblonga, *Wall.* . . 628
oppositifolia, Rottl. 628
ovalis, *Laws.* . . 627
paniculata, Wall. . 624
podopetala, Turcz. . 626
pomifera, Wall. . . 628
pomifera, *W. & A.* 629
prinoides, *DC.* . . 626
reticulata, *Wight* . 627
Roxburghii, *Wall.* . 627
rubra, *Laws.* . . 627
terminalis, Thw. . 624
verrucosa, *Wight* . 628
? viminea, *Wall.* . 627
Wightiana, Wall. . 626
Salmalia malabarica, Schott. 349
Salomonia, *Lour.* . . 206
? *angulata*, Griff. . 207
aphylla, *Griff.* . . 207
canarana, Hassk. . 207
cantoniensis, *Lour.* . 206
ciliata, *DC.* . . . 206
cordata, Arn. . . 206
edentula, *DC.* . . 207
? *Horneri*, Hassk. . 207
obovata, Wight . 207
oblongifolia, *DC.* . 207
leptostachya, Wall. . 207
parasitica, Griff. . 207
petiolata, Ham. . . 207
? *rigida*, Hassk. . 207
sessiliflora, Ham. . 207
? *setoso-ciliata*, Hassk. 207

Page
? *stricta*, Sieb. & Zucc. 207
subrotunda, Hassk. . 206
tenella, H. f. . . 207
? *uncinata*, Hassk. . 207
Salvadora persica, Wall. 582
Samadera, *Gærtn.* . . 518
indica, *Gærtn.* . . 519
lucida, *Gærtn.* . . 519
Sandoricum, *Cav.* . . 553
borneense, Miq. . . 554
emarginatum, *Hiern* 553
glaberrimum, Hassk. 553
indicum, *Cav.* . . 553
Maingayi, *Hiern* . 544
nervosum, Bl. . . 553
ternatum, Blanco . 553
Santiria, *Bl.* . . . 536
apiculata, *A. W. Benn.* 537
conferta, *A. W. Benn.* 537
costata, *A. W. Benn.* 537
fasciculata, *A. W. Benn.* 539
lævigata, *Bl.* . . . 538
Maingayi, *A. W. Benn.* 538
multiflora, *A. W. Benn.* 538
Planchonii, *A. W. Benn.* 536
puberula, *A. W. Benn.* 537
SAPINDACEÆ 668
Sapindus, *Plum.* . . 682
abruptus, Lour. . . 683
abstergens, Roxb. . 682
acuminata, Wall. . 684
acutus, Roxb. . . 682
acutus, Wall. . . 685
adenophyllus, Wall. 677
alternifolius, Hb. Ham. 672
augustifolius, Wall. 685
attenuatus, *Wall.* . 684
benghalensis, Roxb. . 689
bifoliolatus, *Hiern* . 684
bijugus, Wall. . . 671
Danura, *Voight* . . 684
? *deficiens*, W. & A. . 671
detergens, Roxb. . . 683
detergens, Wall. . . 685
edulis, Ait. . . . 687
edulis, Bl. . . . 672
emarginata, Vahl . 682
erectus, *Hiern* . . 683
fraxinifolius, DC. . 672
glabratus, Wall. . . 686
Gleniei, Thw. . . 682

Page
indica, Poir. . . . 685
laurifolia, Vahl . . 682
lepidotus, Wall. . . 556
longifolius, Hb. Ham. 672
longifolia, Vahl . . 685
mollis, Bl. . . . 685
monogyna, Hb. Hey. 689
Mukorossi, *Gærtn.* . 683
multijugus, Wall. . 685
obovatus, W. & A. . 685
pinnatus, Roxb. . . 672
? *pinnatus*, Mill. . 672
polyphyllus, Roxb. . 685
Rarak, DC. . . . 672
rubiginosa, Roxb. . 672
saponaria, Lour. . 672
squamosus, Roxb. . 676
tetraphylla, Vahl . 671
Thwaitesii, *Hiern* . 683
travancorensis, Wall. 532
trifoliatus, *Linn.* . 682
unijuga, Thw. . . 682
undulatus, Wall. . 685
Saponaria, *Linn.* . . 217
oxyodonta, Boiss. . 217
perfoliata, Roxb. . 217
Vaccaria, Boiss. . 217
Vaccaria, *Linn.* . . 217
Sarosanthera lasiopetala, Thw. . . 283
Sarcostigma, *W. & A.* 594
edule, *Kurz* . . . 594
Kleinii, *W. & A.* . 594
Wallichii, *Baill.* . 594
Saurauja, *Willd.* . . 286
cerea, *Griff.* . . . 288
crenulata, Wight . 291
fasciculata, *Wall.* . 287
fasciculata var. *abbreviata*, Chois . 287
ferruginea, Griff. . 288
Griffithii, *Dyer* . . 286
leucophloia, Korth. 287
macrotricha, *Kurz* . 287
media, Korth. . . 287
micrantha, Griff. . 288
napaulensis, *DC.* . 286
paniculata, Wall. . 286
punduana, *Wall* . 287
Roxburghii, *Wall.* . 287
sterculifolia, Griff. . 288
tristyla, *Willd.* . . 287
SAURAUJEÆ 279
Scapha Candollii, Chois. 287
pinangiana, Chois. . 287
Scaphium Wallichii . 361
Schima, *Reinw.* . . 288
crenata, *Korth.* . . 289

Page
hypoglauca, Miq. . 289
khasiana, *Dyer* . . 289
mollis, *Dyer* . . . 288
Wallichii, *Chois.* . 289
Schizandra, *Michx.* . 44
axillaris, *H. f. & T.* 45
elongata, *H. f. & T.* 44
grandiflora, *H. f. & T.* 44
propinqua, *H. f. &* T. 45
SCHIZANDREÆ . . . 39
Schizochiton ? Wall. . 551
Schleichera, *Willd.* . 681
pentapetala, Roxb. 678, 681
pubescens, Roth. . 681
trijuga, *Willd.* . . 681
trijuga, Moritz. 678, 681
Schmidelia acuminata, Thw. 673
adenophylla, Wall. . 674
Aporetica, Wall. . 674
Allophyllus, DC. . 673
bidentata, Wall. . . 673
Cobbe, DC. . . . 674
cochinchinensis, DC. 674
dentata, Wall. . . 674
distachya, DC. . . 674
fœtidissima, Wall. . 674
Gemella, Camb. . . 674
glabra, Wall. . . 674
hispida, Thw. . . 673
integerrima, Wall. 488, 674
Kobbe, Lamk. . . 674
orientalis, Sw. . . 674
ornitrophioides, Wall. 674
racemosa, Linn. . . 674
Rheedii, Wight . . 674
serrata, DC. . . . 674
ternata, Camb. . . 674
timorensis, DC. . . 674
varians, Thw. . . 673
vestita, Wall. . . 674
villosa, Wight . . 674
Schœpfia, *Schreb.* . . 581
acuminata, *Wall.* . 582
fragrans, *Wall.* . . 581
odorata, Wall. . . 581
Schrebera albens, Willd. 623
Sclerostylis Arnottiana, Wight 513
atalantioides, W. & A. 508
atalantioides, Wight 512
ovalifolia, Wight . 512
parvifolia, Wight . 512
racemosa, Wight . 512
rotundifolia, Thw. . 513

Page
Roxburghiana, H. f. & T. 513
Roxburghii, Wight . 513
zeylanica, Wight . 513
Scolopia, *Schreb.* . . 190
acuminata, Clos. . 191
chinensis, Clos. . . 191
crassipes, Clos. . . 191
crenata, *Clos.* . . 191
Gærtneri, *Thw.* . . 191
lanceolata, Clos. . . 191
pseudo-crenata, Clos. 191
pusilla, Moon . . 191
rhinanthera, *Clos.* . 190
Roxburghii, *Clos.* . 190
sæva, Hance . . . 191
Scopolia aculeata, Sm. 497
Scutia, *Comm.* . . . 640
Commersoni, Brongn. 640
indica, *Brongn.* . . 640
lucida, G. Don . . 640
paniculata, Don . 617
Rheediana, Wight . 640
Scutinanthe brunnea, Thw. 531
Scyphopetalum, *Hiern* 675
ramiflorum, *Hiern* . 676
Scytalia bengalensis, Roxb. 689
chinensis, Gærtn. . 688
Danura, Roxb. . . 684
glabra, Hb. Ham. . 565
Litchi, Roxb. . . 688
Longan, Roxb. . . 689
Ramboutan, Roxb. . 687
rubra, Roxb. . . 684
trijuga, Roxb. . . 681
verticillata, Roxb. . 684
Securidaca, *Linn.* . . 207
bracteata, *A. W. Benn.* 208
inappendiculata, Hassk. 208
paniculata, Wall. . 208
scandens, Ham. . . 208
Tavoyana, Wall. . . 208
Seetzenia, *Br.* . . . 424
orientalis, *Dcne.* . 424
Seidlia lanceæfolia, Kostel. 302
Selas lanceolatum, Spr. 498
Semeiocardium glaucescens, Hassk. . 201
Hamiltonii, Hassk. . 201
hyalinum, Hassk. . 201
Senacia nepalensis, DC. 199
Senra, *Cav.* 333
incana, *Cav.* . . . 334
Serræa incana, Dcne. 334

Page
rupestris, Edgw. . 334
Sethia acuminata, Arn. 415
erythroxyloides, Wight 415
indica, DC. . . . 414
lanceolata, Thw. . 415
Shorea, *Roxb.* . . . 303
acuminata, *Dyer* . 305
assamica, *Dyer* . . 307
bracteolata, *Dyer* . 305
floribunda, *Kurz* . 304
gratissima, *Dyer* . 307
laccifera, Heyne . 305
leprosula, *Miq.* . . 305
leucobotrya, Miq. . 306
lissophylla, *Thw.* . 307
longisperma, Roxb. 308
macroptera, *Dyer* . 308
oblongifolia, *Thw.* . 307
obtusa, *Wall.* . . 306
parvifolia, *Dyer* . . 305
penicillata, A. DC. . 306
reticulata, *Thw.* . . 307
robusta, *Gærtn.* . . 306
robusta, A. DC. . . 304
robusta, Roth. . . 305
Roxburghii, Don . 305
sericea, *Dyer* . . . 306
Siamensis, *Miq.* . . 304
stellata, *Dyer* . . 304
stipularis, *Thw.* . . 307
? *suava*, Wall. . . 304
Talura, *Roxb.* . . 304
Tumbuggaia, *Roxb.* 306
Sicyos pentandrus, Wall. 595
Sideroxylon spinosum, Willd. 194
Sida, *Linn.* 322
Abutilon, Linn. . . 327
acuta, Burm. . . 323
alba, Linn. . . . 323
alnifolia, Linn. . . 323
althæifolia, Sw. . . 324
? *amœna*, Wall. . . 328
asiatica, Linn. . . 326
asiatica, Wall. . . 327
aurita, Wall. . . . 328
Beloere, L'Her. . . 326
Boriara, Wall. . . 323
canariensis, Willd. . 323
carpinifolia, *Linn.* . 323
chinensis, Retz . . 324
compressa, DC. . . 323
compressa, Wall. . 323
cordifolia, *Linn.* . 324
corylifolia, *Wall.* . 324
corynocarpa, Wall. . 324

Page
crispa, Linn. . . 328
cuneifolia, Roxb. 322, 374
diversifolia, Spr. . 336
Eteromischos, Cav. . 326
glandulosa, Roxb. . 323
glauca, Cav. . . . 327
glutinosa, Roxb. . 322
graveolens, Roxb. . 327
grewioides, *Guill. & Perr.* 323
herbacea, Cav. . . 324
heterophylla, Spr. . 336
hirta, Wall. . 322, 327
hirta, Lamk. . . . 327
humilis, *Willd.* . . 322
indica, Linn. . . 326
indica, Cav. . . . 328
lanceolata, Roxb. . 323
Leschenaultiana, DC. 325
macrophylla, Wall. . 326
micans, Cav. . . . 324
microphylla, Cav. . 324
montana, Roxb. . 328
morifolia, Cav. . . 322
multicaulis, Cav. . 322
mutica, Delile . . 327
mysorensis *W. & A.* 322
nervosa, Wall. . . 322
obovata, Wall. . . 324
olens, Ham. . . . 322
orientalis, Cav. . . 324
oxyphylla, Wall. . 326
pentacarpos, Roxb. . 324
periplocifolia, Linn. 325
persica, Burm. . . 326
philippica, DC. . . 324
pilosa, Retz . . . 322
pilosa, L'Her. . . 327
polyandra, Roxb. . 326
populifolia, Lamk. . 326
? *radicans*, Cav. . . 322
radicans, Wall. . . 322
ramosa, Cav. . . 328
retusa, Linn. . . . 324
retusa, Wight . . 323
rhombifolia, *Linn.* . 323
rhombifolia, Wall. . 324
rhomboidea, Roxb. . 324
rotundifolia, Cav. . 324
scabrida, W. & A. . 324
Schimperiana, *Hochst.* 322
scoparia, Lour. . . 323
spinosa, *Linn.* . . 323
Stauntoniana, DC. . 323
stipulata, Cav. . . 323
tenax, Ham. . . . 322
tomentosa, Roxb. . 327
unilocularis, L'Her. 322

Page
urticæfolia, W. & A. 322
veronicæfolia, Lamk. 322
villosa, Wall. . . 327
Silene, *Linn.* . . . 217
amœna, Linn. . . 219
apetala, *Willd.* . . 218
arenosa, *C. Koch* . 219
Armeria, Linn. . . 218
colorata, Poir. . 218, 226
conoidea, *Linn.* . . 218
cucubalus, Wib. . . 218
dasyphylla, Turcz. . 219
Falconeriana, *Benth.* 220
gallica, *Linn.* . . 218
graminifolia, Otth. 219
Griffithii, *Boiss.* . . 220
Gul-Waldemarii, Klotzsch . . . 219
indica, Roxb. . . 225
inflata, *Sm.* . . . 218
intrusa, W. & A. . 218
khasiana, *Rohrb.* . 221
kunawarensis, *Benth.* 220
leyseroides, Boiss. . 219
Moorcroftiana, *Wall.* 219
multifida, Edgw. . 220
noctiflora, Linn. . 218
repens, Boiss. . . 219
salsa, Boiss. . . . 219
? Stracheyi, *Edgw.* . 221
suaveolens, Kar. & Kir. 220
tenuis, *Willd.* . . 219
viridiflora, Rohrb. . 221
viscosa, Pers. . . 220
Wallichiana, Klotz. 218
Webbiana, *Wall.* . 220
Webbiana, Wall. . 220
SILENEÆ 212
Simaba quassioides, Ham. 520
SIMARUBEÆ 517
Sinapis alba, Linn. . 157
brassicata, Linn. . 156
cuneifolia, Roxb. . 157
dichotoma, Roxb. . 156
divaricata, Roxb. . 134
erysimoides, Roxb. . 156
glauca, Roxb. . . 156
integrifolia, Willd. . 157
juncea, Linn. . . 157
nigra, Linn. . . . 156
pusilla, Roxb. . . 134
ramosa, Roxb. . . 157
rugosa, Roxb. . . 157
trilocularis, Roxb. . 156
Siphonodon, *Griff.* . . 629
celastrineus, *Griff.* . 629

Page
SISYMBRIEÆ 129
Sisymbrium, *Linn.* . 147
Alliaria, *Scop.* . . 151
axillare, *H. f. & T.* . 149
Columnæ, *Jacq.* . . 150
contortuplicatum, DC. 146
deltoideum, *H. f. & T.* 151
foliosum, *H. f. & T.* 148
himalaicum, *H. f. & T.* 147
humile, *C. A. Mey.* . 148
Irio, *Linn.* . . . 150
irioides, Boiss. . . 150
lasiocarpum, *H. f. & T.* 148
Loeselii, *Linn.* . . 151
minutiflorum, *H. f. & T.* 149
mollissimum, *C. A. Mey.* 147
nudum, Boiss. . . 137
pannonicum, *Jacq.* . 150
planisiliquam, H. f. & T. 152
primulæfolium, Thoms. 152
rupestre, *Edgw.* . . 148
septulatum, DC. . . 150
Sophia, *Linn.* . . 150
strictum, *H. f. & T.* 149
Thalianum, *Gay & Monn.* 148
torulosum, Desf. . 146
Wallichii, *H. f. & T.* 149
Skimmia, *Thbg.* . . 499
Laureola, *H. f.* . . 499
Slackea insignis, Griff. 107
Sladenia, *Kurz.* . . 281
celastrifolia, *Kurz* . 281
Smythea, *Seem.* . . 632
calpicarpa, *Kurz* . 632
Sodada decidua, Forsk. 175
Solandra lobata, Murt. 336
Southwellia nobilis, Salisb. 358
Soymida, *Juss.* . . . 567
febrifuga, *Juss.* . . 567
Spergula, *Linn.* . . 243
æstivosa, Kœn. . . 251
arvensis, *Linn.* . . 243
pentandra, *Linn.* . 243
rubra, *Linn.* . . . 244
Spergularia rubra, St. Hil. 244
Sphæocarya leprosa, Dalz. 579

Page
Sphærosacme decandra, Wall. 562
fragans, Wall. . . 562
? *laxa*, Wall. . . 560
paniculata, Wall. . 560
polystachya, Wall. . 559
Rohituka, Wall. . 560
spicata, Wall. . . 559
Sphærostema axillare, Bl. 45
elongatum, Bl. . . 44
grandiflorum, H. f. & T. 44
grandiflorum, Wall. 44
propinquum, Bl. . 45
Spina spinarum, Rumph. . . . 193
Stachyurus, *S. & Z.* . 288
himalaicus, *H. f. & T.* 288
Stadmannia pubescens, Spr. 681
trijuga, Spr. . . . 681
Stalagmites ovalifolius, G. Don 269
Staphylea, *Linn.* . . 698
Emodi, *Wall.* . . 698
indica, Burm. . . 667
Stauntonia angustifolia, Wall. 108
Brunoniana, Wall. . 108
latifolia, Wall. . . 108
Stelechocarpus, *Bl.* . 47
Burahol, *Bl.* . . . 47
Stellaria, *Linn.* . . . 229
aquatica, *Scop.* . . 229
aquatica, Poll. . . 233
bulbosa, *Wulf.* . . 231
cerastioides, Linn. . 227
crispata, *Wall.* . . 229
decumbens, *Edgw.* . 234
depauperata, *Edgw.* 234
drymarioides, *Thw.* . 229
Fenzliana, Klotzsch 232
glauca, *With.* . . 233
graminea, *Linn.* . . 233
lanata, *H. f.* . . . 232
latifolia, *Benth.* . . 231
longissima, *Wall.* . 232
media, *Linn.* . . . 230
media, Wight . . 229
mollis, Klotzsch . . 232
monogyna, Don . . 230
monosperma, Don . 229
paniculata, *Edgw.* . 229
patens, Don . . . 232
petræa, H. f. & T. . 234
saxatilis, *Ham.* . . 232
semivestita, *Edgw.* . 230

Page
sikkimensis, *H. f.* 230
subumbellata, *Edgw.* 233
thymifolia, Wall. 233
tibetica, *Kurz.* 231
uliginosa, *Linn.* 233
Webbiana, *Wall.* 230
Stemonoporus affinis, Thw. 314
canaliculatus, Thw. 315
distichus, Thw. 303
Gardneri, Thw. 314
lanceolatus, Thw. 315
? *Moonii*, Thw. 316
nitidus, Thw. 316
oblongifolius, Thw. 315
petiolaris, Thw. 315
reticulatus, Thw. 316
rigidus, Thw. 315
scabriusculus, Thw. 303
Wightii, Thw. 314
Stemonurus affinis, Miers 587
apicalis, Miers 584
axillaris, Miers 586
ceylanicus, Miers 586
coriaceus, Miers 586
? *crassipes*, Kurz 587
? *fœtidus*, Wight 589
Gardneri, Miers 586
Heyneanus, Miers 586
longifolius, Miers 586
penangianus, Miers 587
polymorphus, Miers 586
prasinus, Bl. 587
? *secundiflorus*, Bl. 584
? *tomentellus*, Kurz 587
Walkeri, Miers 586
Stephania, *Lour.* 102
elegans, *H. f. & T.* 103
glabra, Miers 103
glandulifera, Miers 103
hernandifolia, *Walp.* 103
hypoglauca, Miers 103
intertexta, Miers 103
japonica, Miers 103
latifolia, Miers 103
longa, Miers 103
rotunda, *Lour.* 103
Roxburghiana, Miers 103
Sterculia, *Linn.* 354
affinis, *Mast.* 361
alata, *Roxb.* 360
alata, Wall. 356
angustifolia, Jack. 358
angustifolia, Roxb. 358
armata, *Mast.* 357
Balanghas, *Linn.* 358
Balanghas, Roxb. 358
bicolor, *Mast.* 359
campanulata, *Wall.* 362
coccinea, Jack 357
coccinea, *Roxb.* 357
coccinea, Wall. 360
colorata, *Roxb.* 359
cuneata, Heyne 356
ensifolia, *Mast.* 359
fœtida, *Linn.* 354
fulgens, *Wall.* 360
fulgens, Wall. 360
guttata, *Roxb.* 355
Heynii, Bedd. 360
Jackiana, Wall. 358
lævis, *Wall.* 357
lanceæfolia, Roxb. 356
lanceolata, Ham. 357
linearicarpa, *Mast.* 360
linguifolia, *Mast.* 357
macrophylla, *Vent.* 356
Maingayi, *Mast.* 359
mollis, Wall. 358
nobilis, *Br.* 358
ovalifolia, Wall. 356
parviflora, *Roxb.* 359
parvifolia, *Wall.* 356
populifolia, *Roxb.* 361
populifolia, W. & A. 361
pubescens, *Mast.* 357
punduana, Wall. 364
Roxburghii, *Wall.* 356
rubicunda, Wall. 360
rubiginosa, *Vent.* 358
scaphigera, *Wall.* 361
striatiflora, *Mast.* 356
Thwaitesii, *Mast.* 361
tubulata, *Mast.* 362
urens, *Roxb.* 355
versicolor, *Wall.* 355
villosa, *Roxb.* 355
STERCULIACEÆ 353
STERCULIEÆ 353
Stigmarosa Jangomas, Lour. 193
Streptostigma viridiflorum, Thw. 692
Strœmeria tetrandra, Vahl 172
trifoliata, Roxb. 172
Strombosia, *Bl.* 579
ceylanica, *Gard.* 579
javanica, *Bl.* 579
javanica, Thw. 579
Struthiola scandens, Wall. 582
Stylophorum, *Nutt.* 119
lactucoides, *Benth. & H. f.* 119
Suriana, *Linn.* 522
maritima, *Linn* 522
Surwala robusta, Rœm. 565
Swietenia Chickrassia, Roxb. 568
chloroxylon, Roxb. 569
febrifuga, Roxb. 567
rubra, Wall. 567
soymida, Dunc. 567
Sotrophola, Hb. Ham. 568
trilocularis, Roxb. 568
velutina, Wall. 568
villosa, Wall. 568
SWIETENIEÆ 541
Synaptea grandiflora, Kurz 301
odorata, Griff. 301

Talauma, *Juss.* 40
Hodgsoni, *H. f. & T.* 40
lanigera, *H. f. & T.* 40
mutabilis, *Bl.* 40
Rabaniana, *H. f. & T.* 40
Talinum, *Adans.* 247
cuneifolium, *Willd.* 247
indicum, W. & A. 247
TAMARISCINEÆ 248
Tamarix, *Linn.* 248
articulata, *Vahl.* 249
articulata, Wall. 248, 249
dioica, *Roxb.* 249
ericoides, *Rothb.* 249
epacroides, Sm. 248
Gallica, *Linn.* 248
Gallica, Wight 248
Germanica, Linn. 250
indica, Kœn. 248
indica, Willd. 248
mucronata, Sm. 249
orientalis, Forsk. 249
Pallasii, Desv. 248
passerinoides, Del. 248
Pharas, Ham. 249
ramosissima, Ledeb. 248
salina, *Dyer.* 248
stricta, *Boiss.* 249
tenacissima, Ham. 249
usneiides, E. Mey. 249
Tarrietia, *Bl.* 362
simplicifolia, *Mast.* 362
Tauscheria, *Fisch.* 163
desertorum, Led. 164
lasiocarpa, *DC.* 164
Terminalia paniculata 419
Ternstrœmia, *Linn.* 280
aneura, Miq. 281
bilocularis, Roxb. 287
? *coriacea*, Wall. 282

Page
crenulata, Wall. . 283
cuneifolia . . . 281
? *dumosa*, Wall. . . 282
emarginata, *Chois.* . 281
? *integerrima*, Wall. 282, 283
japonica, *Thunb.* . 280
? *Khasyana*, Chois. . 281
Lushia, Ham. . . 284
macrocarpa, Scheff. 281
? *macrophylla*, Wall. 290
penangiana, *Chois.* . 281
pentapetala, Jack . 287
racemosa, Don . . 286
? *reticulata*, Wall. . 282
? *sericea*, Wall. . . 283
serrata, Roxb. . . 287
trilocularis, Roxb. . 287
Wightii, Chois. . . 281
TERNSTRŒMIACEÆ . . 279
TERNSTRŒMIEÆ . . 279
Terpnophyllum zeylanicum, Thw. . . 268
Tetracera, *Linn.* . . 31
Assa, *DC.* . . . 31
Euryandra, *Vahl* . 32
lævis, *Vahl* . . . 31
lucida, Wall. . . 32
macrophylla, *Wall.* . 32
Rheedii, DC. . . 31
sarmentosa, Willd. . 31
sericea, Bl. . . . 31
trigyna, Roxb. . . 31
Tetractomia, *H. f.* . . 490
majus, *H. f.* . . . 490
Roxburghii, *H. f.* . 490
Tetradium trichotomum, Lour. 490
Tetramerista, *Miq.* . 526
glabra, *Miq.* . . . 526
Thalictrum, *Linn.* . . 10
acaule, Camb. . . 12
alpinum, *Linn.* . . 12
bracteatum, Roxb. . 2
Chelidonii, *DC.* . 11
Chelidonii, H. f. & T. 11
cultratum, *Wall.* . 11
cysticarpum, Wall. 11
Dalzelli, *Hook.* . . 13
elegans, *Wall.* . . 10
fœtidum, Linn. . . 14
foliolosum, *DC.* . . 14
glyphocarpum, *W. & A.* 14
Javanicum, *Bl.* . . 13
Kemense, Fries . . 14
macrostigma, Edgw. 11
majus, Jacq. . . . 14

Page
marginatum, Royle . 12
Maxwellii, Royle . 14
microphyllum, Royle 12
minus, *Linn.* . . 14
minus, Boiss. . . 14
neurocarpum, Royle 11
pauciflorum, *Royle* . 11
pedunculatum, *Edg.* 12
platicarpum, *H. f. & T.* 11
Punduanum *Wall.* 13
radiatum, Royle . 13
reniforme, *Wall.* . 11
rostellatum, *H. f. & T.* 12
rotundifolium, *DC.* 13
rutæfolium, *H. f. & T.* 12
saniculæforme, *DC.* 13
secundum, Edgw. . 11
vaginatum, Royle . 14
virgatum, *H. f. & T.* 12
Thea assamica, aff. sp. Chois. . . . 290
assamica, Mast. . 292
chinensis, Linn. . 292
viridis, var., Chois. 290
Thlaspi, *Linn.* . . . 161
alpestre, *Linn.* . . 162
arvense, *Linn.* . . 162
cardiocarpum, *H. f. & T.* 162
cochleariforme, DC. 162
cochlearioides, *H. f. & T.* 162
Griffithianum, Boiss. 162
THLASPIDEÆ . . . 160
Thuya aphylla, Linn. . 249
Thylacospermum, *Fenzl.* 243
rupifragrum, *Schrenck.* . . . 243
TILIACEÆ 379
Tiliacora, *Colebr.* . . 99
abnormalis, Miers . 99
acuminata, Miers . 99
cuspidiformis, Miers 99
fraternaria, Miers . 99
racemosa, *Colebr.* . 99
TILIEÆ 380
Timœosia rupestris, Klotzsch . . . 217
Tinomiscium, *Miers* . 97
petiolare, *Miers* . . 97
Tinospora, *Miers* . . 96
cordifolia, *Miers* . 97
crispa, *Miers* . . . 96
malabarica, *Miers* . 96
tomentosa, *Miers* . 96

Page
uliginosa, *Miers* . . 97
TINOSPOREÆ . . . 94
Toddalia, *Juss.* . . 497
aculeata, *Pers.* . . 497
? *angustifolia*, Lamk. 497
angustifolia, Miq. . 497
asiatica, Lamk. . . 497
bilocularis, *W. & A.* 497
floribunda, Wall. . 497
mitis, Miq. . . . 492
nitida, Lamk. . . 497
rubicaulis, Willd. . 497
TODDALIEÆ 484
Tonsella disperma, Poir. 625
prinoides, Willd. . 626
Toona ciliata, Rœm. . 569
febrifuga, Rœm. . 569
hexandra, Rœm. . 569
longifolia, Rœm. . 569
serrata, Rœm. . . 569
? *velutina*, Rœm. . 568
? *villosa*, Rœm. . . 568
Toxicodendrum Cobbe, Gærtn. 674
Tribulus, *Linn.* . . 423
alatus, *Del.* . . . 423
cistoides, *Linn.* . . 423
lanuginosus, Linn. . 423
terrestris, *Linn.* . . 423
Trichadenia, *Thw.* . . 196
zeylanica, *Thw.* . . 196
Trichaurus ericoides, W. & A. . . . 249
Trichilia coriacea, Wall. 564
? *longissima*, Wall. . 552
nervosa, Vahl . . 553
spinosa, Willd. . . 512
trifoliata, Wall. . . 564
venosa, Spr. . . . 553
? *villosa*, Wall. . . 564
TRICHILEÆ 540
Tridesmis formosa, Korth. 258
ochnoides, Spach . 258
pruniflora, Kurz . 258
Trigoniastrum, *Miq.* . 208
hypoleucum, *Miq.* . 208
Trigonochlamys, *H. f.* 539
Griffithii, *H. f.* . . 539
Triguera acerifolia, Cav. 336
Triomma, *H. f.* . . 528
malaccensis, *H. f.* . 528
Triphasia, *Lour.* . . 506
aurantiola, Lour. . 507
? *sarmentosa*, Bl. . . 509
trifoliata, *DC.* 507, 508
Tristellateia, *Thouars* 418

Page
australasica, *A. Rich.* 418
Triumfetta, *Linn.* 394
  angulata, Lamk. 395
  angulata, β acuminata, Wall. 395
  annua, *Linn.* 396
  Bartramia, Roxb. 395
  bilocularis, Wall. 395
  cana, *Bl.* 396
  glabra, *Hb. Miss.* 395
  glandulosa, Heyne 395
  indica, Ham. 394
  indica, Lamk. 396
  ? *microphylla*, W.&A. 396
  neglecta, *W. & A.* 396
  oblonga, Wall. 394
  oblongata, Link. 395
  orbiculata, Kœn. 395
  ovata, DC. 394
  pentandra, Guill. & Perr. 396
  pilosa, *Roth.* 394
  pilosa, Wall. 394
  pilosa, var. Thw. 394
  pilosula, Thw. 396
  polycarpa, Wall. 395, 396
  rhomboidea, *Jacq.* 395
  rotundifolia, *Lam.* 395
  semitriloba, *Linn.* 396
  suborbiculata, DC. 395
  tomentosa, *Bojer.* 394
  tomentosa, Wall. 395
  trichoclada, Link. 396
  trilocularis, *Roxb.* 395
  vestita, Wall. 394, 395
Trochisandra indica, Bedd. 622
TROCHODENDREÆ 39
Trollius, *Linn.* 22
  acaulis, *Lindl.* 22
  pumilus, *Don* 22
  pumilus, Royle 22
Tunica, *Scop.* 215
  stricta, *Bunge* 216
Turpinia, *Vent.* 698
  latifolia, Wall. 699
  martabanica, Wall. 699
  microcarpa, W. & A. 699
  nepalensis, Wall. 699
  pomifera, *DC.* 698
Turræa, *Linn.* 541
  alata, Wight 542
  pinnata, Wall. 543
  trichostylis, Miq. 379
  villosa, *Benn.* 542
  virens, *Linn.* 541
  virens, Hellen. 512
Turritis glabra, DC. 135

Page
  rigida, Wall. 135
Tytonia natans, G. Don 483

Unona, *Linn.* 58
  Alphonsii, Wall. 62
  cauliflora, *H. f. & T.* 60
  chinensis, DC. 59
  cochinchinensis, DC. 59
  cordifolia, Roxb. 59
  crinita, *H. f. & T.* 61
  Dasymaschala, *Bl.* 61
  desmantha, *H. f. & T.* 61
  Desmos, *Dun.* 59
  discolor, *Vahl* 59
  dumosa, *Roxb.* 59
  Dunalii, *Wall.* 58
  Dunalii, H. f. & T. 59
  elegans, *Thw.* 58
  fulva, Wall. 59
  grandiflora, DC. 47
  hamata, Dun. 54
  latifolia, *H. f. & T.* 60
  Lawii, *H. f. & T.* 59
  leptopetala, Dun. 56
  longiflora, *Roxb.* 61
  Narum, Dun. 50
  odorata, Dun. 56
  pannosa, *Dalz.* 58
  pedunculosa, A. DC. 59
  præcox, *H. f. & T.* 60
  pycnantha, *H. f. & T.* 60
  stenopetala, *H. f. & T.* 60
  suaveolens, Bl. 55
  undulata, Wall. 59
  virgata, Bl. 57
  viridiflora, *Bedd.* 60
  zeylanica, *H. f. & T.* 58
UNONEÆ 46
Urena, *Linn.* 329
  cana, Wall. 329
  cordata, Hb. Heyne 330
  Hamiltoniana, Wall. 330
  heterophylla, Sm. 330
  Lappago, DC. 330
  lobata, *Linn.* 329
  morifolia, DC. 330
  muricata, DC. 330
  palmata, Roxb. 329
  repanda, *Roxb.* 330
  rigida, *Wall.* 330
  rigida, Wall. 330
  scabriuscula, DC. 329
  scabriuscula, Wall. 329
  sinuata, *Linn.* 329
  speciosa, Wall. 330
  tomentosa, Wall. 330
URENEÆ 318
Usubis triphylla, Burm. 674

Page
Uvaria, *Linn.* 47
  axillaris, *Roxb.* 56
  bicolor, Roxb. 80
  bicolor, Wall. 81
  bracteata, *Roxb.* 49
  cauliflora, Wall. 66
  cerasoides, Roxb. 64
  cordata, Wall. 49
  coriacea, Vahl 51
  costata, Wall. 67
  dioica, Roxb. 87
  dulcis, *Dun.* 48
  elegans, Wall. 82
  elliptica, A. DC. 92
  excelsa, Wall. 77
  farcta, Wall. 56
  ferruginea, Ham. 52
  fornicata, Roxb. 71
  fulgens, Wall. 82
  fulva, Wall. 79
  gigantea, Wall. 75
  Gomeziana, A. DC. 49
  grandiflora, Roxb. 47
  hamata, Roxb. 54
  Hamiltoni, *H. f. & T.* 48
  heteroclita, Roxb. 45
  Heyneana, Wall. 77
  Heyneana, W. & A. 51
  hirsuta, *Jack* 48
  Javana, Dun. 48
  lanuginosa, Wall. 79
  latifolia, Bl. 79
  Lobbiana, *H. f. & T.* 49
  longifolia, Lamk. 62
  lurida, *H. f. & T.* 50
  lurida var. β., H. f. & T. 50
  lutea, Roxb. 89
  lutea, Wall. 51
  lutea, vars., W. & A. 77, 89
  mabiformis, Griff. 82
  macrophylla, *Roxb.* 49
  macropoda, *H. f.* 50
  manubriata, Wall. 79
  micrantha, *H. f. & T.* 51
  mollis, Wall. 58
  Narum, *Wall.* 50
  nervosa, Wall. 79
  nutans, Wall. 72
  obovata, Heyne 75
  obtusa, Bl. 76
  odorata, Lamk. 56
  odoratissima, Roxb. 54
  ophthalmica, Roxb. 72
  oxyantha, Wall. 83
  parviflora, *H. f. & T.* 51
  pauciovulata, *H. f. & T.* 51
  polyantha, Wall. 81

Page
prismatica, Wall. 81
ptychocalyx, *Miq.* 49
purpurea, *Bl.* 47
reticulata, Bl. 77
Roxburghiana, Wall. 71
rubiginosa, A. DC. 79
Russellii, Wall. 89
sclerocarpa, A. DC. 52, 88
semecarpifolia, *H. f. & T.* 49
sphenocarpa, *H. f. & T.* 48
suberosa, Roxb. 65
subrepanda, *Wall.* 50
sumatrana, *H. f. & T.* 51
tomentosa, Roxb. 88
trichomalla, Bl. 48
tripetala, Roxb. 72
velutina, Dun. 87
ventricosa, Roxb. 89
villosa, Roxb. 87
virgata, Bl. 57
zeylanica, *Linn.* 51
UVARIEÆ 46

Vareca heteroclita, Roxb. 186
lanceolata, Roxb. 188
Vateria, *Linn.* 313
acuminata, *Heyne* 313
acuminata, Thw. 314
affinis, *Thw.* 314
canaliculata, *Thw.* 315
ceylanica, *Wight* 314
cordifolia, Thw. 317
disticha, Thw. 303
elegans, Thw. 317
Gardneri, *Thw.* 314
indica, *Linn.* 313
indica, Thw. 313
jucunda, *Thw.* 314
lanceæfolia, Roxb. 302
lanceolaria, Roxb. 302
lanceolata, *Thw.* 315
lanceolata, Roxb. 302
malabarica, Bl. 313
Moonii, *Thw.* 316
nitida, *Thw.* 316
oblongifolia, *Thw.* 315
petiolaris, *Thw.* 315
reticulata, *Thw.* 316
rigida, *Thw.* 315
Roxburghiana, Wight 302
scabriuscula, Thw. 303
Wightii, Thw. 314
Vatica, *Linn.* 301
acuminata, A. DC. 314
affinis, *Thw.* 303
canaca, Ham. 302

Page
canaliculata, A. DC. 315
chinensis, Linn. 302
? cordifolia, *Thw.* 303
? disticha, *A. DC.* 303
faginea, *Dyer.* 301
Gardneri, A. DC. 314
grandiflora, *Dyer* 301
Helferi, *Dyer* 302
laccifera, W. & A. 305
lanceæfolia, *Bl.* 302
lanceolata, A. DC. 315
Maingayi, *Dyer.* 302
Moonii, A. DC. 316
nitida, A. DC. 316
oblonga, A. DC. 315
obtusa, Steud. 306
pallida, *Dyer* 302
petiolaris, A. DC. 315
reticulata, A. DC. 316
rigida, A. DC. 315
robusta, Steud. 306
Roxburghiana, *Bl.* 302
scabriuscula, *A. DC.* 303
scaphula, *Dyer* 301
Thwaitesii, A. DC. 314
Tumbuggaia, W. & A. 306
Wightii, A. DC. 314
Velaga xylocarpa, Gærtn. 369
VENTILAGINEÆ 630
Ventilago, *Gærtn.* 630
bombaiensis, *Dalz.* 631
bracteata, Wall. 631
calyculata, *Tulasne* 631
denticulata, Willd. 631
leiocarpa, *Benth.* 631
macrantha, Tulasne 631
madraspatana, Benth. 631
madraspatana, *Gærtn.* 631
madraspatana, Roxb. 631
Maingayi, *Laws.* 631
silhetiana, Tulasne 631
Smithiana, Tulasne 631
sulphurea, Tulasne 631
Viola, *Linn.* 182
apetala, Roxb. 185
aspera, Ging. 184
biflora, *Linn.* 182
cæspitosa, Don 183
canescens, Wall. 184
canina, *var.*, *Linn.* 185
chinensis, Don 183
cinerea, *Boiss.* 185
confusa, Benth. 184
diffusa, *Ging.* 183
distans, *Wall.* 183

Page
dubia, Wall. 185
enneasperma, Roxb. 185
erecta, Roth. 185
Falconeri, *H. f. & T.* 185
frutescens, Roth. 185
grandifolia, Wall. 183
Griffithiana, Boiss. 184
? *Hamiltoniana*, Don 184
hirta, Linn. 184
Hookeri, *Thoms.* 183
kunawarensis, Royle 185
Metziana, Hohen. 184
mysorensis, Wall. 183
nilagirica, Turcz. 184
Notoniana, Wall. 184
odorata, *Linn.* 184
? *palmaris*, Buch. 184
Patrinii, *DC.* 183
pilosa, Bl. 184
primulifolia, Linn. 183
reniformis, Wall. 183
Royleana, Wall. 184
serpens, *Wall.* 184
serpens, Wall. 184
suffruticosa, Roxb. 185
sylvatica, *Fries* 185
tenuis, Benth. 183
Walkerii, Wight 183
Wallichiana, Ging. 183
Wightiana, Wall. 184
Wightiana, Wt. Ic. 184
Wightiana, *vars.*, Thw. 184
VIOLACEÆ 182
VIOLEÆ 182
Visenia concatenata, Spr. 374
corchorifolia, Spr. 374
supina, Spr. 374
tomentosa, Miq. 374
umbellata, Wight 374
Vismia ? arborescens, Chois. 258
Vitis, *Linn.* 645
adnata, *Wall.* 649
anamallayana, *Bedd.* 656
angustifolia, *Wall.* 654
araneosus, *Dalz.* 657
assamica, *Laws.* 648
assimilis, Kurz. 660
atroviridis, Wall. 663
auriculata, *Roxb.* 658
barbata, *Wall.* 651
bracteolata, *Wall.* 654
campylocarpa, *Kurz.* 657
canarensis, *Dalz.* 655
cantoniensis, *Seem.* 663
capriolata, *Don* 659

Page
carnosa, *Wall.* 654
cinnamomea, *Wall.* 659
cinnamomea, *Wall.* 650
cinnamomea, var., Wall. 659
compositifolia, *Laws.* 659
coralloides, H. f. 659
cordifolia, Roth. 651
costata, Wall. 647
crenata, Wall. 654
diffusa, *Miq.* 646
discolor, Bl. 647
discolor, *Dalz.* 647
divaricata, *Wall.* 657
diversifolia, Wall. 647
dubia, *Laws.* 661
elegans, *Kurz.* 659
elongata, *Wall.* 658
erioclada, *W. & A.* 651
erythroclada, Kurz. 663
furcata, *Laws.* 646
Gardneri, *Thw.* 656
gigantea, *Bedd.* 648
glaberrima, *Wall.* 646
glaberrima, Wall. 645
glabrata, Heyne 652
glandulosa, *Wall.* 652
glauca, *W. & A.* 648
glauca, Wall. 646
glyptocarpa, *Thw.* 645
gracilis, *Wall.* 653
hederacea, Wall. 657, 659
Helferi, *Laws.* 662
heterophylla, Wall. 653
Heyneana, DC. 651
Heyneana, *Wall.* 647
himalayana, *Brand.* 655
Hookeri, *Laws.* 661
inæqualis, Wall. 647
indica, *Linn.* 653
indica, Hb. Ham. 651
indica, Thw. 651
indica, Wall. 652
Kleineii, Wall. 648, 652
Labrusca, Linn., *var.* γ, Regel 651
læta, Wall. 648
lanata, Hb. Roxb. 651
lanata, *Roxb.* 651
lanata, Wall. 650
lanceolaria, *Roxb.* 660
lanceolaria, Wall. 661
lanceolaria, Wight 661
latifolia, Hb. Ham. 651
latifolia, *Roxb.* 652
Linnæi, *Wall.* 649
lonchiphylla, *Thw.* 646
macrostachys, *Miq.* 650

Page
mollis, *Wall.* 660
mollissima, *Wall.* 656
montana, *Laws.* 652
muricata, W. & A. 660
neilgherrensis, Wight 656
nervosa, *Laws.* 650
nitida, *Laws.* 662
novemfolia, *Wall.* 662
obovata, *Laws.* 658
obtecta, *Wall.* 657
pallida, *W. & A.* 647
paniculata, Hb. Heyne 660
paniculata, Wall. 649
parvifolia, *Roxb.* 652
pedata, *Vahl* 661
pedicellata, *Laws.* 650
peduncularis, *Wall.* 655
pentagona, *Roxb.* 646
pentagona, *Hb. Ham.* 651
planicaulis, *H. f.* 658
polystachya, *Wall.* 662
polystachya, Wall. 662
pterisantha, Miq. 664
? *Purani*, Don 652
quadrangularis, *Wall.* 645
repanda, *W. & A.* 648
repens, Lamk. 647
repens, Wall. 649
repens, *W. & A.* 646
reticulata, *Thw.* 655
Rheedei, *W. & A.* 653
rosea, Royle 648
Roxburghii, *W. & A.* 655
rubifolia, *Wall.* 663
rugosa, H. f. & T. 650
rugosa, Wall. 651, 653
rumicisperma, *Laws.* 661
sagittifolia, *Laws.* 645
semicordata, Wall. 656
serratifolia, W. & A. 660
serrulata, Wall. 659
setosa, *Wall.* 654
sikkimensis, *Laws.* 650
spectabilis, *Kurz.* 649
sulcata, *Laws.* 661
tenuifolia, *W. & A.* 660
ternata, Heyne 650
Thomsoni, *Laws.* 657
tomentosa, *Heyne* 650
trichophora, Wall. 663
trifida, Roth. 650
trifolia, Linn. 654
triloba, Heyne 650
truncata, Miq. 652
tuberculata, *Bl.* 656
tuberculata, Wall. 661
vinifera, *Linn.* 652

Page
vulpina, Linn., *var.* γ., Regel 652
Wallichii, DC. 652
Wallichii, Kurz. 647
zeylanica, Russ. 652
Vittmannia elliptica, Vahl 519
  lucida, Steud. 519

Wahlenbergia, Br. 570
Walkera serrata, Willd. 525
Wallichia spectabilis, DC. 371
Walsura, *Roxb.* 563
  Gardneri, *Thw.* 563
  hypoleuca, *Kurz.* 564
  ? *lanceolata*, Wall. 555
  neurodes, *Hiern* 564
  piscidia, *Roxb.* 564
  pubescens, Kurz. 565
  robusta, *Roxb.* 565
  ternata, *Roxb.* 563
  trichostemon, Miq. 563
  tubulata, *Hiern* 563
  villosa, *Wall.* 563, 564
Waltheria, *Linn.* 374
  americana, Linn. 374
  elliptica, Cav. 374
  indica, *Linn.* 374
WINTEREÆ 39
Wissadula, *Medik.* 325
  Leschenaultiana, *Mst.* 325
  periplocifolia, Thw. 325
  rostrata, *Planch.* 325
  zeylanica, Medik. 325
Wormia, *Rottb.* 35
  bracteata, H. f. & T. 37
  dentata, DC. 35
  excelsa, H. f. & T. 35
  hamata, Vahl 299
  integra, H. f. & T. 37
  oblonga, *Wall.* 35
  pulchella, *Jack* 36
  subsessilis, Miq. 35
  suffruticosa, *Griff.* 35
  triquetra, Rottb. 35

Xanthochymus ovalifolius, Roxb. 269
  ovalifolius, ? Bedd. 269
  pictorius, Roxb. 269
  tinctorius, DC. 269
  spicatus, W. & A. 269
Xanthophyllum, Roxb. 208
  affine, *Korth.* 209
  angustifolium, Wight 209
  Arnottianum, Wight 209
  ellipticum, *Korth.* 211

Page
flavescens, *Roxb.* . 209
flavescens, Wall. . . 209
glaucum, *Wall.* . . 209
Griffithii, *H. f.* . . 210
insigne, *A. W. Benn.* 211
Maingayi, *H. f.* . . 210
obscurum, *A. W. Benn.* 211
paniculatum, Miq. . 209
Roxburghianum, Wt. 209
rufum, *A. W. Benn.* 210
stipitatum, *A. W. Benn.* 210
undulatum, Wight . 209
virens, Roxb. . . 209
Xanthoxylon, see Zanthoxylum
Xerospermum, *Bl.* . 686
Noronhianum, *Bl.* . 686
Ximenia, *Linn.* . . 574
ægyptiaca, Juss. . 574
ægyptiaca, Roxb. . 522
americana, *Willd.* . 574
? *lanceolata*, DC. . 498
? *olacoides*, W. & A. 573, 584
Russelliana, Wall. · 574
Xylocarpus ? *Antila*, Hb. Ham. . . 568
Granatum, Kœn. . 567
moluccensis, Rœm. . 567
obovatus, A. Juss. . 567
Xylopia, *Linn.* 82
caudata, *H. f. & T.* 85
Championii, *H. f. & T.* 84
dicarpa, *H. f. & T.* 85
elliptica, *Maing.* . 86
ferruginea, *H. f. & T.* 83
fusca, *Maing.* . . 83
magna, *Maing.* . . 84
Maingayi, *H. f. & T.* 85
malayana, *H. f. & T.* 83
nigricans, *H. f. & T.* 84
obtusifolia, *H. f. & T.* 83
oxyantha, *H. f. & T.* 83
parvifolia, *H. f. & T.* 84
pustulata, *H. f. & T.* 85
XYLOPIEÆ 46
Xylosma, *Forst.* . . 194
controversum, *Clos.* 194
latifolium, *H. f. & T.* 194
longifolium, *Clos.* . 194

ZANTHOXYLEÆ . . . 484
Zanthoxylum, *Linn.* . 492
acanthopodium, *DC.* 493
alatum, *Roxb.* . . 493
alatum, Wall. . . 493

Page
armatum, Roxb. . 496
? *Bajarnandia*, Wall. 496
Budrunga, *Wall.* . 495
? *connaroides*, W. & A. 496
crenatum, Wall. . . 495
cuspidatum, Champ. 494
? *Finlaysonianum*, Wall. 496
floribundum, Wall. . 497
Hamiltonianum, *Wall.* 494
hostile, Wall. . . . 493
khasianum, *H. f.* . 494
Lamarckianum, Cham. 488
? *longifolium*, Wall. 496
lucidum, Wall. . . 492
Marambong, Miq. . 488
myriacanthum, *Wall.* 496
nilagiricum, Miq. . 487
nitidum, Wall. . . 497
oblongum, Wall. . 495
obtusifolium, Poir. . 496
ovalifolium, *Wight* . 492
oxyphyllum, *Edgw.* 494
planispinum, S. & Z. 493
pteleæfolium, Cham. 488
Rhetsa, *DC.* . . . 495
rhoifolium, Lamk. . 496
Roxburghianum, Cham. 487
Rumphianum, Cham. 489
sapindifolium, Wall. 496
sepiarium, Wight . 493
Serra, Turcz. . 286, 496
sorbifolium, St. Hil. 496
spondiæfolium, Wall. 496
tetraspermum, *W. & A.* 494
? *Timbor*, Wall. . . 493
tomentellum, *H. f.* . 493
triflorum, Turcz. . 496
triphyllum, Wight . 487
violaceum, Wall. . 494
zeylanicum, DC. . 487
ZIZYPHEÆ 630
Zizyphus, *Juss.* . . . 632
acuminata, Royle . 634
albens, Roxb. . . 634
apetala, *H. f.* . . 635
Baenchia, Wall. . 637
Bhunder, Royle 636, 637
? *Burræa*, Ham. . 636
calophylla, *Wall.* . 636
caracutta, Roxb. . 634
celtidifolia, DC. . 634
cuneata, Wall. . . 634
? elegans, *Wall.* . . 637
elliptica, Roxb. . . 634

Page
ferruginea, Heyne . 634
flavescens, Wall. . . 637
flexuosa, Wall. . . 633
floribunda, Wall. . 637
funiculosa, *Ham.* . 636
glabra, Roxb. . . 636
glabrata, *Heyne* . . 633
globularis, *Wall.* . 637
hamosa, Wall. . . 641
horrida, *Roth.* . . 636
Horsfieldii, Miq. . 637
incurva, *Roxb.* . . 635
Jujuba, *Lamk.* . . 632
latifolia, Roxb. . . 636
Linnæi, *Laws.* . . 635
Lotus, *Lamk.* . 633, 637
lucida, *Moon.* . . 635
mauritiana, Hb. Ham. 632
microphylla, Roxb. 633
Napeca, Linn. . . 635
Napeca, *Willd.* . . 635
Napeca, Roxb. . . 634
nitida, Roxb. . 633, 637
nummularia, *W. & A.* 633
obliqua, Heyne . . 636
Œnoplia, *Mill.* . . 634
oppositifolia, Wall. 641
orbicularis, Schult . 634
oxyphylla, *Edgw.* . 634
pallens, Wall. . . 634
paniculata, Roth. . 636
pedicellata, Wall. . 634
rotundifolia, Lamk. 633
rotundifolia, Roth. 634
rufula, Miq. . . . 634
rugosa, *Lamk.* . . 636
ruminata, Ham. . 634
sativa, Gærtn. . . 633
scandens, Roxb. . 634
? *sinensis*, Lamk. . 633
Sororia, Schult. . . 632
Spina-christi, Linn. 637
? *tomentosa*, Roxb. . 636
trinervia, Roxb. . 633
trinervius, Roth. . 632
trinervius, β. Roth. 633
? *venulosa*, Wall.. . 636
vulgaris, *Lamk.* . . 633
wynadensis, *Bedd.* . 633
xylopyrus, *Willd.* . 634
Zollingeria, *Kurz* . . 692
macrocarpa, *Kurz* . 692
ZYGOPHYLLEÆ . . . 422
Zygophyllum, *Linn.* . 424
coccineum, *Linn.* . 425
? *connaroides*, W. & A 565
simplex, *Linn.* . . 424

END OF VOL. I

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